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Vol. CCXLII No. 6189

LONDON, APRIL 2, 1954

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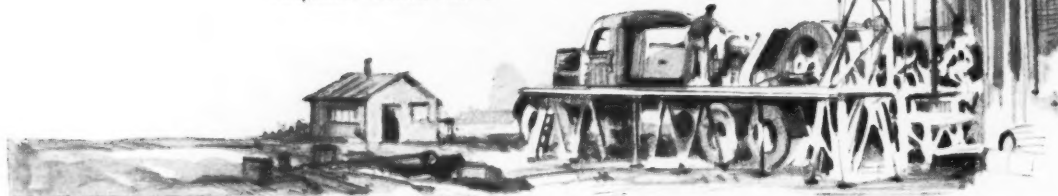
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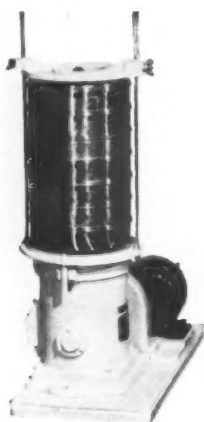
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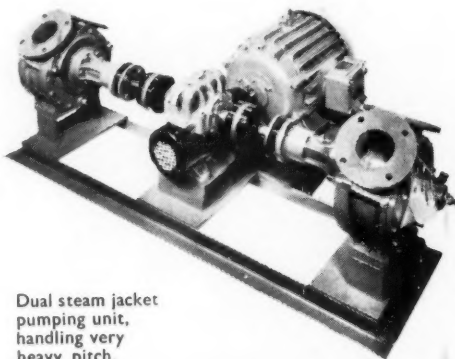
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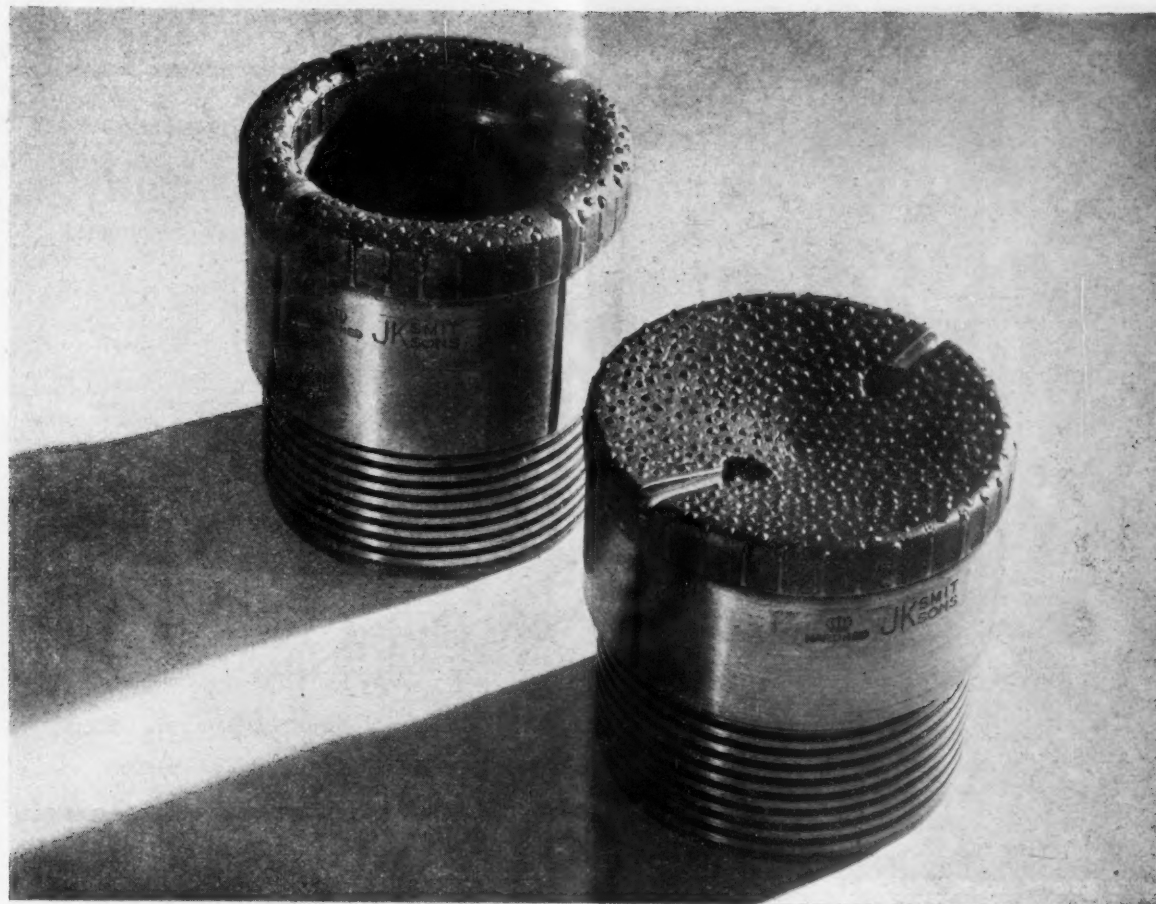


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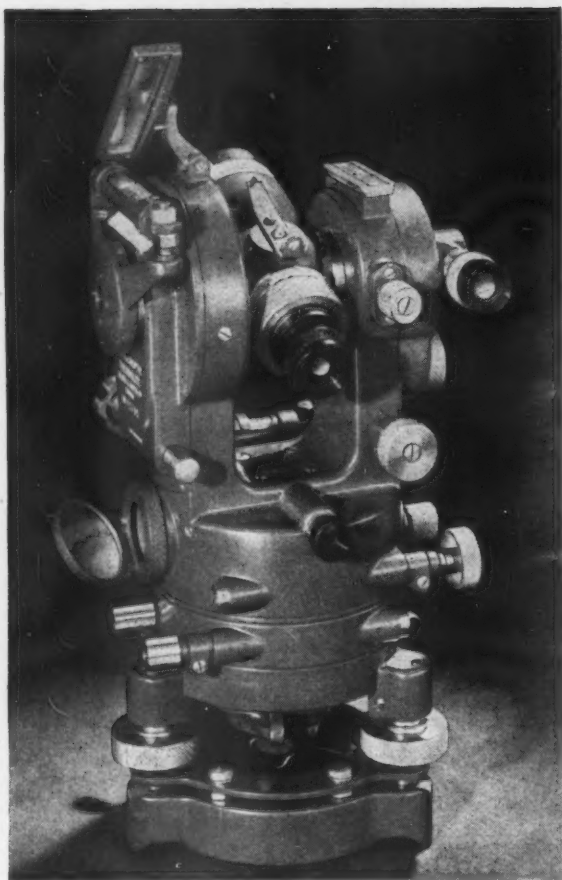
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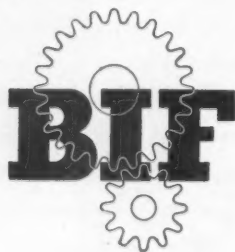
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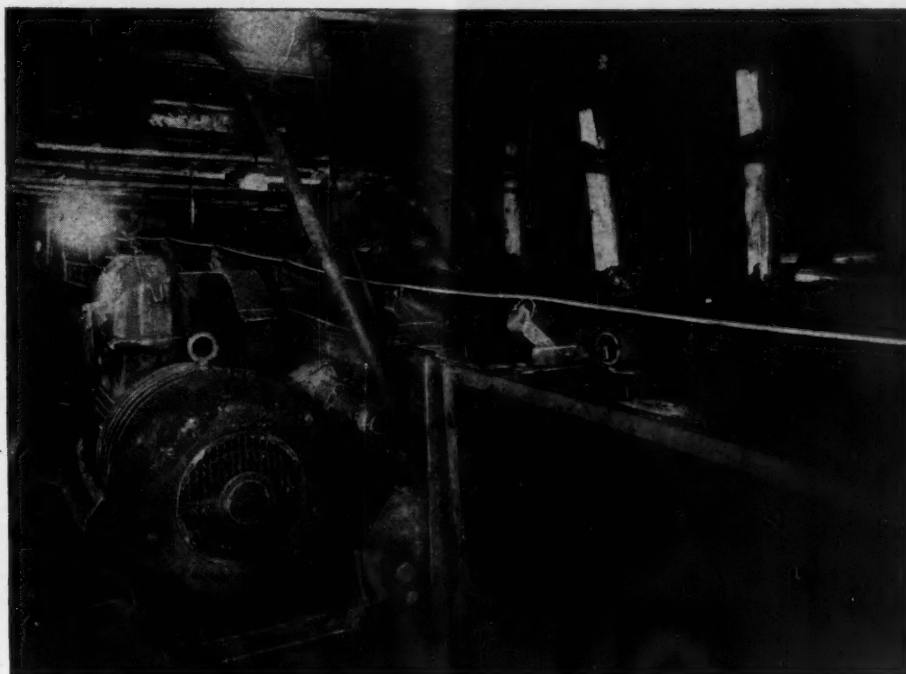
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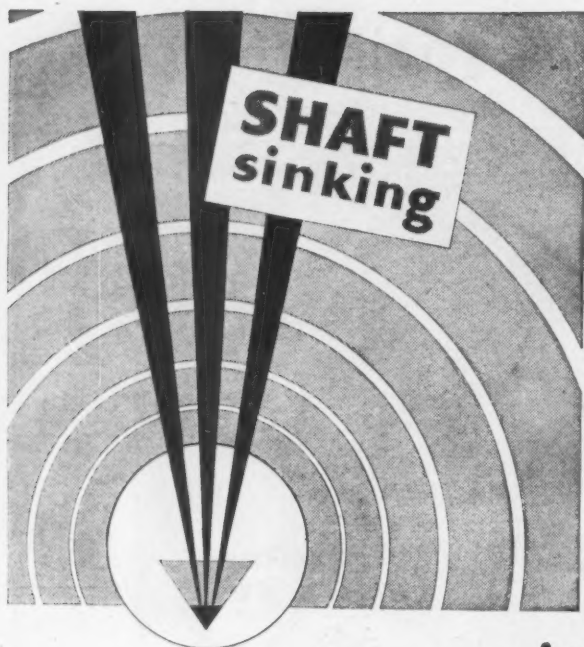
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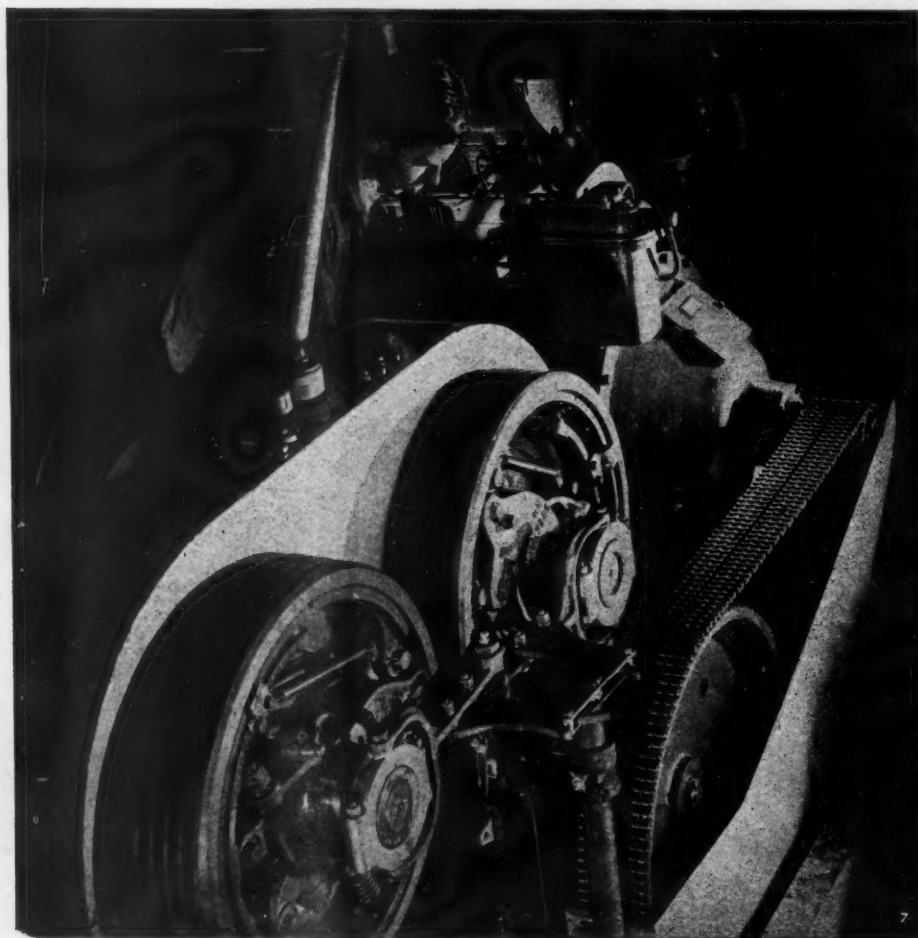


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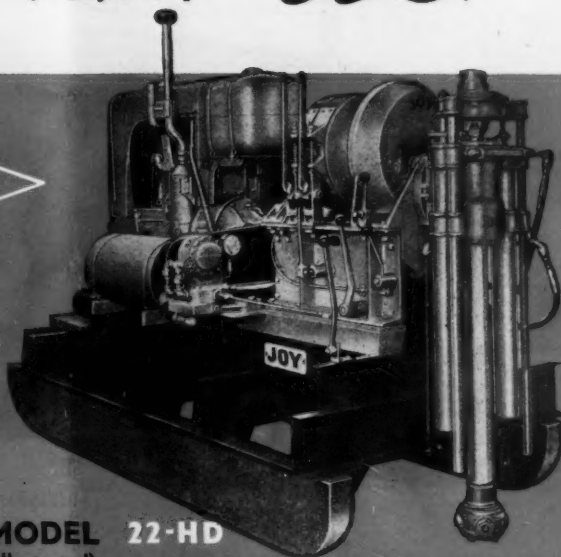
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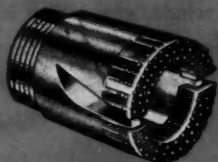
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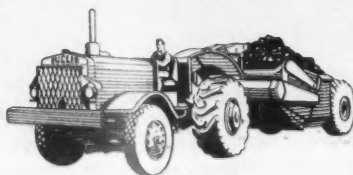
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NOTES AND COMMENTS

Eisenhower's Policy on Stockpiles and Foreign Trade

U.S. policy statements in the field of raw materials are now coming thick and fast after the prolonged period of apparent indecision at the White House since the new Administration took over. In this column last week we referred to the O.D.M. order giving effect to the Administration's reaffirmed intention of not dumping surplus strategic stocks on world markets. This announcement was followed up last Friday by a lengthy preliminary White House statement on future strategic stockpile plans, providing for the future buying of hundreds of millions of dollars worth of metals and minerals for the U.S. stockpile.

The statement conveys an impression that the plan is to be of gigantic scope without it being very enlightening as to details. On the one hand we are told that the new programme will result in additional Government acquisitions of from 35 to 40 metals and minerals, and at the same time Mr. Fleming, Director of the O.D.M., is reported as saying that while the new programme will be of considerable magnitude it is only a beginning. It is clear, however, that in essence the new programme is, wherever possible, to be directed to purchases from domestic producers.

The White House statement emphasizes that the new stockpile policy is based on a preliminary report from the President's Minerals Policy Committee appointed some five months ago. The full report is expected to be submitted to the Cabinet shortly and, meanwhile, the White House statement lists three general considerations which will go towards determining new long-term stockpile objectives.

- (1) It will be assumed, for the purpose of calculating long-term stockpile objectives, that, in the event of war, supplies will not be available from foreign sources except in the case of that limited group of countries to which wartime access can be had with the same degree of reliance as afforded by sources within the U.S.A. It is recognized that, at such a time, some of these foreign sources of supply will be available to the United States. It is impossible, however, to predict with accuracy just what areas will be accessible for obtaining large quantities of

strategic and critical materials. Under the circumstances, therefore, the Government has decided to follow a policy which, when consummated, will mean that the risk of strategic and critical metals and minerals becoming a "bottleneck" will be virtually eliminated.

- (2) It will be assumed that in the event of an emergency some supplies from domestic sources may not be available, in view of the fact that the Soviets now have the capability of attack on the United States.
- (3) Wherever possible strategic and critical metals and minerals in the stockpile will be upgraded and refined to the point at which they will be more readily useable in the event of an emergency.

The statement makes it clear that "policies now in effect covering speedy acquisition of metals and minerals to meet the present minimum stockpile objectives will be continued," and it goes on to say that the U.S. policy of exchanging surplus farm commodities for strategic materials would also be continued.

Despite the emphasis on strategic considerations throughout the White House statement it is difficult to escape the conclusion that, cogent as these may be, the new policy has been introduced at this time primarily as an economic instrument of domestic price support. It has certainly been hailed by domestic mining interests as such and it may well go some way towards overcoming the strong opposition of western congressmen to any extension to the Reciprocal Trade Agreements Act, who see in it an indefinite postponement of tariff relief.

It is probably significant that this policy statement should have been made a few days before President Eisenhower launched his foreign trade programme, which he did last Tuesday. In this connection, his policy recommendations to Congress closely follow those of the Randall Commission and in particular he has asked Congress for a three year extension of the Reciprocal Trades Agreement Act; for authority to reduce tariffs on a selected range of goods by not more than 5 per cent during each of these three years; for simplification of customs procedures; for legislation

to encourage a greater flow of U.S. capital overseas; for modification of the "Buy-American" Act; and finally for moves to bring about freer convertibility.

One way and another it is clear that the President is going to have a fight on his hands with the protectionist element in Congress, and it remains to be seen whether the Administration's vast new stockpiling programme will buy adequate support for its foreign economic policy.

Trade with the U.S.S.R.

Discussions in the House of Commons earlier this week were not very fruitful in making the picture clearer on the question of the scope and enforcement of the controls over the export of strategic goods to the countries of the Soviet bloc. In fact, close questioning of the President of the Board of Trade failed to elicit from Mr. Thorneycroft any details arising from his recent talks on the subject of East-West trade with the United States and the French Governments. However, he did say that the three countries found themselves in complete agreement that, while controls must be maintained on the export of those goods which would be of direct value to the Soviet bloc militarily, particularly in unconventional weapons, they agreed that a substantial relaxation of the controls on other goods should be sought so that there would be a basis on which ordinary civilian trade could expand. Such a relaxation, Mr. Thorneycroft said, was fully compatible with security requirements.

All that being so, the three countries were now proceeding to discuss with other friendly governments the detailed application of this policy. The proposal which they would put forward, he said, would be to examine the scope and effect of the controls, category by category. The whole operation, it was hoped, would take no more than two or three months, and it was hoped to introduce agreed changes by stages.

Thus it would appear that the British Government, at any rate, are thinking in terms of a relaxation of the present controls by the end of June at the latest.

Nothing more, of course, can be said at present, as the proposals will have to be scrutinized by the 14 Western countries comprising the Paris Committee on East-West trade. But it is encouraging to know that a close examination of the controls will now be made in the light of the recent trade offers by the U.S.S.R., a successful conclusion to which would benefit this country's engineering industry enormously.

Australia's Gold Production Highest For 14 Years

Gold production in Australia in 1953 was the highest for 14 years according to statistics released by the Commonwealth Statistician. Total production was 1,052,779 f.o.z., and represented an increase of 7½ per cent over that achieved in 1952. Yet the total is still 35 per cent less than the total production attained in 1939.

The current year has begun well and Western Australia, which contributed no less than 818,516 f.o.z. of the 1953 total output, has produced during the first two months of 1954 as much as 121,561 f.o.z. compared with 116,362 f.o.z. in the corresponding period of last year. Nevertheless, the future is uncertain. The prospects of a higher price for gold do not appear bright; the wages position, though improved, is still unstable; while industry in general must counter increases in the basic wage by improved mining methods and higher all round efficiency—an objective not easy to attain in an industry that has already achieved a high state of efficiency. Indeed, it would appear that only an increase in the price of gold would provide the stimulus necessary to raise gold production to approximately the pre-war level.

Western United States

(From Our Own Correspondent)

Portland, Oregon, March 20.

Stanford Research Institute, in co-operation with the Foreign Commerce Department of the U.S. Chamber of Commerce, has submitted to the Chamber a plan for encouraging foreign investment of American capital. The report states there is great need for aid in the further development of the economies of the free nations and that it is in the interest of the United States to further such development. Emphasis is placed on the use of tax incentives as an encouragement to such foreign investments, in which the report follows to some extent the recommendations of the Randall Commission.

THE BASE METAL INDUSTRIES

Continued progress in mining and treatment methods for low grade copper ores has brought about the removal of the town of Santa Rita, New Mexico, where Kennecott's Chino operation is situated. When operations commenced at Chino about 45 years ago, two per cent copper was considered about the downward limit for successful operation and a townsite was chosen where the copper content of the area was considered too low to make it attractive for mining. Now that a profit is being realized from ores carrying 0.8 per cent and even less, the ground under the townsite has become valuable and the town is being moved a mile and a half to the north-west to make room for the extension of the Chino open pit.

Coeur d'Alene district in Idaho is the latest to feel the pinch of the lead-zinc price situation and in the past month practically every major producer in the district reduced its working time from six to five days a week, affecting about 3,000 employees. Sunshine and Polaris are exceptions as their ores are high in silver. In fact the action of the other mines was to their benefit as it eased a shortage of labour. Sunshine, largest silver producer in the country, is carrying on an extensive development programme in the course of which it recently opened a new ore shoot with silver content of 45 oz. per ton.

The "split check" system (*Mining Journal*, December 18, 1953) seems to be working out well in at least some of the mines in which it has been employed, as it keeps the mines open and the men working. One of the smaller operations reports a monthly output of 2,500 tons with a total of 46 men as compared with a previous output of 3,500 tons with 85 men, an increase in per man output of one-third. Because of more careful mining where the men have a direct interest, mill heads have been increased 50 to 67 per cent in value and the actual cost to the company per lb. of metal has decreased. Likewise the men have profited in that invariably they are earning more than regular wages and some have averaged as high as \$33 per day.

TUNGSTEN MINING OPERATIONS

Standard Tungsten Corporation of New York, controlled by Chinese capital, has acquired by purchase or lease four tungsten mines in Arizona and New Mexico and is engaged in active development and mill construction. At its Pine Creek tungsten mine in California U.S. Vanadium has completed a 1,500 ft. twin raise from its main haulage level to the upper workings. Pine Creek is at a high elevation and winter snows are a serious problem. The new raise will afford inside transportation and materially expedite handling of ore from mine to mill.

At Grass Valley, California, Idaho-Maryland, once next to the largest gold producer in the United States, but now operating on a greatly curtailed basis, is turning to tungsten mining. Ore of good quality has been found over a vertical

range of 1,400 ft. and milling facilities are available although these will have to be modified for the treatment of tungsten ore. Calera Mining Co. (Howe Sound) has negotiated a government loan for further active exploration of its copper-cobalt property in Lemhi County, Idaho. Calera has been operating a cobalt refinery using the Chemico process at Garfield, Utah, but operation has been hampered by such difficulties as are apt to be encountered in application of a new process. Interest is manifested in a reported discovery of a large deposit of copper-nickel ore on Yacobi Island off the coast of Alaska. First reports indicate very high grade copper with workable values in nickel in sufficient quantity to be a distinct asset to the territory but definite figures are not available as yet.

URANIUM IN THE COLORADO PLATEAU

The interest of established mining companies in the Colorado Plateau region continues. Homestake, which has been operating uranium properties in Wyoming and North Dakota, has purchased the entire capital stock of Little Beaver Mining Co. and has optioned a large group of claims in addition. Shattuck-Denn, a leading copper-lead-zinc producer of Arizona, has commenced shipping after completing a 500 ft. shaft on its lease at Uravan, Colorado. While interest is centred on such sensational mines as Mi Vida, Big Indian or Cal-Uranium, it should be borne in mind that for each large mine there are dozens of small operations. Some of these are co-operating and working through a common shaft but most of them are individual self-contained operations. This is uneconomical and a prominent operator in the district recently estimated that it is probable that not over two per cent of the ore actually in the ground is extracted.

As some indication of the possibilities of the field it is authoritatively stated that Mi Vida, best known and probably the richest of the mines, shipped ore of the value of \$2,400,000 within 15 months of the time that sinking of the first operating shaft was started.

Mr. Phillip L. Merritt, assistant director of A.E.C.'s raw minerals division, stated recently that 11 deposits, each having a potential production in excess of 100,000 tons, are known besides innumerable small deposits of undetermined possibilities.

Mexico

(From Our Own Correspondent)

Jalisco, March 24.

Mr. Manuel Campillo, spokesman for the Mexican mining industry, reported that a number of leading mining companies are sustaining such heavy losses in their operations that they face closure unless a rapid solution is found to the industry's problems. Declining prices and lowered demand in world markets are additional crippling blows, Mr. Campillo said. He declined to name the firms threatened for fear of touching off alarm among associated firms and thereby damaging their credit. But it is known that among mines already closed is the long-established Santa Rosalia operation in Lower California.

Tax relief is urgently needed if the industry is to survive. Mr. Campillo insisted, for there can be no savings in production costs as a result of higher labour, freight, fuel and equipment charges. At present Mexican mining operations pay 12 different forms of tax including the mining fund on production, general export, a 15 per cent *ad valorem* import, Schedules 1, 2 and 3, installation and real estate taxes. Foreign capital is not interested in strengthening the industry unless adequate tax relief and the complete solution of transportation and distribution problems is forthcoming.

While the rumours of expropriation of the industry are vigorously denied, a strong segment of disgruntled, low-financed Mexican operations appear to be putting pressure to bear on the Treasury and Department of National Economy to expropriate foreign interests. Impartial observers here feel that this would not be any ready solution of the problem, as was the case with the oil industry. Mexico cannot afford to damage its credit at a time when it is embarked on a wide-scale economic development programme. Expropriation may be excellent in theory, but there is not enough Mexican capital to ensure efficient operation, apart from heavy investments required for modernization of machinery and other relevant expenditures.

There has been much talk by the Departments of Economy and Treasury of measures to "aid the industry" but so far the plans have been rather nebulous. Mexico continues to produce metals at a much higher cost than other nations. Constantly increasing union demands for higher wages, high freight costs and the numerous crippling taxes, make it impossible to solve the current "critical situation" without governmental aid. Whether Mexico is prepared to grant subsidies or not is a moot question at this time.

NEGOTIATIONS WITH U.S. OPERATORS

American Smelting and Refining Co. startled the industry by announcing it planned to shut down its Dolores operation at Angangueo, in the State of Michoacan, with closure date set at April 18. Unprofitable operation is the reason given for this step by American Smelting officials, although the Union of Mining and Metallurgical Workers asserts that the shut down is due to the recent sharp drops in world market quotations for lead and zinc, which is not necessarily the same thing.

The Mexican Mine Workers' Union charged American Smelting with "bad faith" and breach of promises to continue working the mine, which has a payroll in excess of 600 men. A recent explosion and fire had "perilled" further working of the mine, according to A.S. and R. officials. But the union brought in experts who claimed that re-opening of concrete plugs at different levels would make possible low-cost rehabilitation of the mine. The sixth and eighth levels of the Dolores mine have been opened up and engineers state there have been no cave-ins and that the mine can still be worked. A.S. and R. has no comment to pass on this statement, but stands firm on its shut-down order.

It is learned from reliable sources that a move has been started to cancel the Mexican government's permit for the exploitation of the mine, and that it should be turned over to the workers who claim, through their representatives, that "magnificent exploitation at low cost" is absolutely feasible. It is claimed that the silver extracted would assay approximately 700 grammes of silver to one per cent of lead. The mine is essentially a silver operation and the fabulous Well 40 of this mine has been producing 40 kg. of silver per ton with 10 per cent of lead.

The mine union insists that this "wealth" should be turned over to the workers after the "foreign concession" has been cancelled. At time of writing there has as yet been no official decision on this point.

While problems continue to beset the industry a trend has appeared towards the exploration for new mining deposits. In Oaxaca, according to reports issued by the State government's mining agency, important manganese deposits have been located in the Nochistlán region, and are being exploited by Manganese del Centro, S.A., a Mexican operation, which is shipping approximately four freight cars weekly; the Totocono Mining Company ships up to six cars and several other local mining operations are shipping ore on a smaller scale.

Orientated Diamond Drill Bits—I

A considerable amount of constructive practical work and laboratory investigation on the orientation of diamond drill bits has been carried out in the United States since the first published findings on the subject appeared in 1951-1952. The following article, which is the first of two instalments, summarizes the latest published reports on orientation and describes tests carried out by A. E. Long, chief of the Diamond Bit and Diamond Drilling Consulting Section of Region Eight, U.S. Bureau of Mines. The tests were described by the Bureau in *Report of Investigations 5015*.

A further most comprehensive account has recently been given by A. E. Long of his work on the orientation of diamond drill bits. In this latest series of tests the diamond boart was orientated in both hard vector and soft-vector directions in the crowns of AX bits. Test drilling was done in a dyke of saussuritized dacite porphyry similar to a fine grain granite in hardness and durability. Only high grade drill boart was used, taken from a single packet of diamonds ranging at from 8 to 12 diamonds per carat. All bits were AX size, bevel wall, four-waterway, double-round-nose, with 148 diamonds cast-set in a beryllium-copper (Be 3.96 per cent; Cu 96.04 per cent) matrix alloy.

The diamond drill was a small air-powered screw-feed, underground model equipped with a high-torque, rotary-type motor rated at 19½ h.p., when operated at its maximum speed on air compressed at 80 lb./sq. in. Most of the drilling was done with the 400 feed gear; rotational speed ranged from 1,100 to 1,800 r.p.m. This report gives the results obtained from ten tests with 117 bits for drilling 5,520 ft.

Three different methods were employed for the setting and resetting of the bits in each of the ten different tests.

First, group "A" bits, with diamonds orientated in hard-vector directions. When diamonds were salvaged from the worn bits, enough new, unused stones were added to the number of resettable stones recovered to reset the bit with the required 148 diamonds per bit. Second, group "B" bits, with diamonds orientated in hard-vector directions. The bits were cannibalized, that is, only resettable diamonds recovered from bits included in this group were reset and

no new diamonds were added. This was done to learn what the cumulative effect would be when the same diamonds are repeatedly reset in hard-vector directions in successive bits. Third, group "C" bits, with diamonds

orientated in soft-vector directions. As in group B, the bits in group C were cannibalized in order to learn what the cumulative effect would be when the same diamonds are repeatedly reset in soft-vector directions in successive bits.

In the ten tests, 50 hard-vector bits were used in the tests, five to each test. Five hard-vector bits were used in the first test on group B bits and four in each of the subsequent nine tests of the group, a total of 41 bits. In group C, comprised of soft-vector bits, five bits were used in the first test, four in the second and third, three in the fourth and fifth, two in the sixth and seventh, and one in each of the last three tests, a total of 26 bits.

After each bit had been tested it was deep acid etched, a process which exposed the diamonds so that under magnification the orientation of each diamond could be determined. Subsequently the diamonds were removed from the crown either by acid etching or by an electrolytic process, and were cleaned and dried. The diamonds from each bit were then sorted into resettable stones and into scrap, or stones deemed unfit for resetting. The number and carat weight of the resettable stones recovered from each bit were determined, as also was the carat weight of the scrap recovered from each bit tested. Diamond loss was calculated by subtracting the carat weight of the resettable stones from the set-up weight of the bit from which the resettable stones were salvaged.



Typical high grade drill boart at 8 times magnification

DIAMOND LOSSES

Test No.	Hard vector bits New diamonds added each resetting Group A				Hard vector bits cannibalized No new diamonds added each resetting Group B				Soft vector bits cannibalized No new diamonds added each resetting Group C			
	Orientated* %	Loss†	Bit loss‡	Loss§ %	Orientated* %	Loss†	Bit loss‡	Loss§ %	Orientated* %	Loss†	Bit loss‡	Loss§ %
1	65	0-009	5-8	4-7	66	0-007	4-7	4-5	43	0-022	11-0	11-3
2	86	0-007	2-8	1-8	85	0-008	3-4	2-9	20	0-034	10-0	8-9
3	80	0-005	2-0	0-9	86	0-009	3-4	2-5	22	0-040	11-7	9-8
4	82	0-015	4-4	3-1	87	0-014	4-0	3-4	24	0-064	14-6	14-6
5	81	0-019	6-7	5-7	90	0-013	3-5	2-4	21	0-079	20-2	12-6
6	89	0-016	3-1	1-2	91	0-015	3-2	1-7	17	0-205	25-2	32-4
7	87	0-016	2-9	1-5	86	0-011	2-4	1-2	15	0-109	18-3	19-9
8	88	0-019	4-3	2-3	90	0-018	3-5	1-8	13	0-179	26-8	43-2
9	90	0-009	2-6	1-3	92	0-007	2-2	0-5	13	0-107	19-3	27-0
10	94	0-009	3-0	2-0	94	0-009	3-0	1-8	9	0-056	18-0	15-0
Weighted average		0-011				0-010				0-055		

* Percent of diamond orientated in hard-vector directions in bits used in each of the 10 tests.

† Average diamond loss in ct./ft. drilled in each of the 10 tests.

‡ Percent of bit set-up weight of diamonds lost in each of the 10 tests.

§ Percent of bit stone-count lost in each of the 10 tests.

Note.—A statistical study of commercially produced, random-set bits in which high-grade drill boart were used shows that about 45% of the stones were set in hard-vector directions.

Results of the drilling tests conducted with the 117 bits included in the ten tests are summarized below.

The desired orientation of all the diamonds was never achieved in the hard- or soft-vector bits, due principally to the tendency of the diamonds to shift from their set position when the mould was filled with the molten alloy in casting. This tendency was partly eliminated as the setter gained experience, placing the diamonds in more stable positions and more closely controlling the pouring temperature. The improvement in achieving the desired orientation of diamonds in the finished test bits used in tests 1 through 10 is shown by data in the table on facing page.

Only a few of the bits in each group varied considerably in performance from the norm of that particular group. When a bit failed to conform to the norm of its group, an attempt was made to find the cause. In almost every one of these particular cases a higher than normal number of stones were set in unintended vector directions on the inside

tangent of the contour of the crown.

The diamond losses for each of the three groups of bits are given in detail in the table on facing page. The second

columns in each grouping show that the diamond losses in the soft-vector group were consistently higher than the diamond losses for the other two groups (hard-vector directions). No great differences in diamond losses per ft. drilled between the hard-vector bits, whether cannibalized or newly added diamonds, were observed. The two last columns substantiate that orientations in soft-vector directions cause progressively greater diamond losses after resetting. The table shows relationship between efficiency of orientation and number and weight of diamonds lost.

The original report classifies the stones according to crystal shape, crystal habit and colour and reaches the conclusion that large included flecks of carbon or other foreign matter have a bad effect on drill board impairing shock and abrasion resistance.

AVERAGE RESULTS OBTAINED FROM DRILLING TESTS

Tests conducted with the 117 orientated diamond bits	Vector orientations		
	Hard-vector		Soft-vector
	Group A†	Group B‡	Group C‡
Number of bits tested	50	41	26
Feet drilled	2332.0	2053.8	1134.3
Average feet drilled per bit	46.6	50.1	43.6
Average penetration rate	3.12*	3.19*	3.13*
Number of diamonds set per bit	148	148	148
Average number diamonds set in hard-vector directions per bit	124	127	35
Average number diamonds set in soft-vector directions per bit	24	21	113
Diamond weight before tests	91.52	72.01	72.44
Total diamond loss	26.80	20.82	62.12
Average diamond loss per bit	0.54	0.51	2.39
Average diamond loss per foot drilled	0.011	0.010	0.055
Diamonds recovered as scrap	13.32	9.07	34.74
Percent total diamond loss recovered as scrap	49.7	43.6	55.9
Resettable diamonds at end of tests	64.72	51.19	10.32
Resettable diamonds at end of tests, percent of original weight	70.7	71.7	14.2
Number new diamonds at beginning tests	907	740	740
Number resettable diamonds at end tests	725	599	142
Average size diamonds at beginning tests	10	10	10
Average size resettable diamonds at end tests	11	12	14

* Information recently received from a diamond core-drilling contracting firm indicates that a bit in which the drill board are orientated in hard-vector directions will penetrate medium-hard, sedimentary rocks about 25 per cent faster than a bit in which the drill board are set in random-vector directions.

† New diamonds added each resetting.

‡ Bits cannibalized, no new diamonds added each resetting.

Manganese in Bombay State, India

Demand for manganese from India has promoted the growth of the mining industry in Bombay State, where certain deposits have proved to be of commercial importance. The following condensation from *Mineral Trade Notes*, Vol. 37 No. 5, published by the U.S. Bureau of Mines, presents a comprehensive picture of current mining operations carried out by the nine manganese mining leaseholders of the State, prefaced by brief remarks on the effect of State legislation on operators. The article is in two parts of which this is the first. In the concluding part, the manganese resources of Southern Bombay will be reviewed.

The apparently continuous demand for Indian manganese ore has brought about a significant growth in the mining industry in Bombay State within the last three years. Production of manganese ore in 1952 was 135,000 l.tons, more than double that of 1950, and estimated production in 1953 was 160,000 l.tons.

Only the most general estimate of reserves of manganese ore in marketable grades in Bombay State can be made, and placed at approximately 3,500,000 tons.

EXPLOITATION PROCEDURE

The relations between the State Government and the manganese mine owners are governed by the Mineral Concession Rules, 1949, of the Government of India. These rules authorize the State Governments to issue prospecting and mining leases covering manganese deposits in their areas against the levy of prescribed fees and on stipulated conditions.

Owing to the mining companies' practice of applying for prospecting licences only after conducting substantial prospecting, they actually mine on the prospecting licences. They cannot, however, sell their production commercially unless a royalty is paid in advance. This customarily is done by depositing money with the district officers on the basis of minehead stocks. The difference between the amount deposited and the amount actually due on the

basis of the sale price is subsequently adjusted. As it takes 18 months to two years to obtain a mining lease, companies operate on this basis during the validity of the prospecting leases. After the mining leases are obtained, the royalty is paid periodically on the ore actually sold.

As many of the manganese mines are in heavily forested areas, the Forest Department of the Government of Bombay must give the mine owners permission to clear the forest before mining is allowed. No figures are available on the amount of royalty and dead rent on manganese mining areas collected by the Bombay Government in previous years, but the Assistant Geologist to the Government of Bombay expects to collect Rs.300,000 in royalties and Rs.100,000 in dead rent during 1953.

MARKETING METHODS

Transportation is difficult throughout the State and mine owners construct many roads themselves and also maintain at their own expense those roads of the Forest Department used by them. Most of the manganese ore is exported through the port at Bombay, with the rest going through Mormugao, Portuguese India. Facilities in Bombay port are considered adequate.

The larger mine owners sell their production direct to foreign buyers on long-term contracts. The small mine owners usually sell their ore at either the railhead or the port to mineral exporters or to financiers. This procedure

is adopted because of insufficient capital to engage mining labour continuously and owners are obliged to sell their daily output at the minehead to ore brokers.

TREATMENT OF LOW GRADE ORES

The Indian Bureau of Mines and the National Metallurgical Laboratory at Jamshedpur is reported to have found a successful method of beneficiating low-grade manganese ore. The Bureau of Mines states that owing to the tendency of producers to selectively mine ores which bring high prices, dumps of lower-grade ore have been built up near most of the manganese mines. It is claimed that about 3,750,000 tons of marketable ore is available in dumps in Madhya Pradesh; dumps in the Srikakulam district of Andhra State contain about 1,200,000 tons; and dumps in Bihar and Orissa contain 200,000 tons. To use ore from these dumps, heavy-media beneficiation units will have to be installed at a cost of some hundreds of thousands of rupees. For mines producing from 10 to 50 tons a day, a medium-size plant has been designed as the result of investigations conducted by the Bureau of Mines and the National Metallurgical Laboratory.

The Bureau of Mines found that mines producing only 5 to 10 tons a day could not afford to install this machinery so research to find cheaper methods was undertaken. It is claimed that "lower grade ore from the Keonjhar area containing 35 per cent manganese has been upgraded by a comparatively cheap method to 47 per cent and it is expected that this cheap process will be finalized shortly."

MANGANESE OCCURRENCES OF THE STATE

According to *Mineral Resources of Bombay*, prepared by Dr. B. C. Roy for the Geological Survey of India, manganese ore has been found by reconnaissance to occur in 12 of the 25 administrative districts of Bombay State. Only the deposits in the Panch Mahals and Baroda districts in northern Bombay and in the Belgaum and North Kanara districts in southern Bombay have been determined to be of commercial importance. There are nine manganese mining leaseholders in the State, of whom three hold leases in the Panch Mahals and Baroda districts and the others in Belgaum, North Kanara, and Ratnagiri.

The Shivrajpur Syndicate operates deposits at Shivrajpur and Bamankua. The Shivrajpur mines consist of two reefs of manganese ore in deep and sagging strikes that lie adjacent to each other and are separated by about 500 ft. One reef is about a mile long and contains high-grade ore, and the other, which is about 800 ft. shorter, is a low-grade reef averaging 42 per cent ore. The Shivrajpur mines are about 300 ft. above sea level, and both reefs are said to be 500 ft. deep. Company officials state that the ore becomes of a progressively higher grade and hardness as mining goes deeper. Average monthly production at Shivrajpur mine is 6,000 tons, which can be doubled if necessary without increasing the labour force or equipment. Proved reserves in the mine are placed at 300,000 tons, and probable reserves may reach 1,000,000 tons.

Both open-pit and underground mining are used at the mine. Shivrajpur Syndicate is the only company operating an underground manganese mine in Bombay State and is believed to be one of the only two companies in India engaged in underground mining for manganese ore. The other company is the Central Provinces Manganese Ore Co. Ltd., of Nagpur. Although the Shivrajpur mine is more mechanized than any other in Bombay State, the extent of mechanization is not great and may be gauged from the following list of equipment now in use: 1 diamond drill of 500 ft.; 2 jeeps; 2 trucks; 1 carryall; 44 pneumatic drills; 10 air compressors; 5 diesel oil engines (tub pushers); and 1 wagon drill of 22 ft. capacity. It is believed that the possibility of increased mechanization is question-

able because of the hard and uneven rock formation in the area and the higher production cost in terms of the present volume of output that would be entailed. The company employs 3,000 workers in the Shivrajpur mine, 700 of whom work underground.

The company is more favourably situated than the majority in Bombay State in regard to ore transport. It has its own rail sidings and stock yards both in Shivrajpur and Bamankua and obtains all rail wagons needed. About 80 per cent of the company's output is sold to United States buyers under long term contracts. Sales are made on the f.a.s. basis. Three grades of ore are sold, but the present tendency is to sell as much medium- and low-grade ore as possible during the current manganese boom and conserve high-grade ore for leaner days. The company also blends its ore to required specifications.

The Bamankua mine of Shivrajpur Syndicate is four miles from the Shivrajpur railway station. The mine is open pit, although workings are about 80 ft. below ground level. Its reef lies northwest-southeast and is 2,500 ft. long, 100 ft. wide, and of unknown depth. The ore is harder than that at Shivrajpur and includes all grades.

The Pani mine in Baroda district is being diamond drilled. Prospects are promising, and it is reported that the company plans to sink a shaft. The narrow gauge railway from Shivrajpur passes through Pani thus providing a railhead at the mine. Manganese ore reserves at the three concessions are conservatively estimated at 1,000,000 tons.

Sundar Minerals Ltd. began operations in Shivrajpur near the end of 1952. The deposits contain mostly medium- and low-grade ores, which are extracted by manual labour and a few hand tools. Production in 1953 was expected to be 6,000 tons. Adequate rail wagons are available to transport the ore to Bombay and ore reserves have not been estimated.

Arvind Tanna and Co. Ltd. has operated a manganese mine at Anas on the broad gauge railway of the Western Railway since June, 1952. The mining area comprises 162 acres and contains ore deposits in reef formation. Mining is by open pit with the help of labour and hand tools. The ore is mostly medium- and low-grade with occasional finds of high-grade. Preliminary investigations of 60 acres reveal a reserve of 72,000 tons. From June to December, 1952, the company produced 150 tons of ore and hopes to reach a rate of 1,500 tons a month by increasing the present labour force of 500. The ore is transported four and a half miles by trucks from the mine to Anas, the railhead loading point. Rail wagons have not been difficult to obtain.

BARODA DISTRICT

Operations at the Pani mine are currently exploratory. Extraction of ore by open pit has been completed, and the area is being explored by diamond drilling. In mid-February, 1953, drilling was at 438 ft. No details of the results were available, but the company was planning to a shaft for subsurface mining. Reserves of the Shivrajpur concession—Shivrajpur, Bamankua, and Pani, are estimated at 1,000,000 tons.

In the past, geologists have reported that the manganese reef from Shivrajpur to Pani, a total distance of some 14 miles, has proved to be almost continuous. An occurrence of manganese has been located at Chetapur, about five miles east of Pani on the same strike. In the Pani area the workings are spread along a two mile long strip, with varying width up to 40 ft., the depth of the excavations being upwards of 50 ft. The lode is known to be highly distorted. The central portion of the orebody has the form of a flattened "S" with the ends extending in parallel but displaced directions, being folded in a vertical plane, but a folding in a horizontal plane seems evident from the working at the extreme eastern end.

Relationship Between the Mining and Heavy Chemical Industries of S. Africa

The chemical industry of South Africa is now the fourth largest in the country and is on the threshold of further expansion. Its progress has been closely linked with the production of commercial explosives, which in turn has been continually expanded to meet the growing requirements of the mining industry. The following article describes the Union's chemical industry, which now covers a wide field, much of its output consisting of heavy chemicals for mines and factories.

In 1950 the net output of chemicals in the Union of South Africa amounted in value to £22,020,000, representing an increase of 71.9 per cent over the 1945 figure of £12,821,000. Excluding carbide and cyanide, for which separate statistics are available, the value of chemicals consumed by the South African mining industry in 1951 totalled £595,622, purchases from local manufacturers amounting to £425,030 against imports of only £170,592. The heavy chemicals industry originated concurrently with the explosives industry, because in order to manufacture commercial explosives economically, it is essential for many of the basic ingredients to be produced within the same organization. Among these ingredients are nitric acid, sulphuric acid, ammonia, and ammonium nitrate.

The basis of the heavy chemicals industry is the production of nitric acid and sulphuric acid. Nitroglycerine and nitro cotton are formed by the action of a mixture of these two acids on glycerine and nitro cotton respectively. The nitric acid is obtained from the oxidation of ammonia, which in turn is obtained synthetically from air and coal. Ammonium nitrate, the third essential ingredient of commercial blasting explosives, is formed by the reaction between ammonia and nitric acid.

GELATINOUS AND AMMON EXPLOSIVES

Two main types of blasting explosives are produced in South Africa. The first group comprises gelatinous explosives, manufactured by gelatinizing nitro cotton with nitro-glycerine in the presence of alcohol, and then mixing them with certain carbonaceous materials. This group includes the ordinary gelignites, which on account of their higher cost have been largely superseded by the so-called ammon gelignites containing high percentages of nitrogen. These explosives have better water-resisting properties than dynamites and are suitable for blasting all hard rocks. Dynamites are explosives in powder form and are made by mixing nitro-glycerine with ammonium nitrate and carbonaceous material to produce ammon dynamite. Both ammon gelignites and ammon dynamites are produced in various grades. Generally speaking, the higher grades are used in the mining of metal and the lower grades in coal mining and for quarrying purposes.

The industry also produces "permitted" explosives to cater for the exceptional conditions encountered in "fiery" coal mines. These are the ammon gelignites Ajax and Saxonite and the ammon dynamite Monobel. They contain inert salts which lower the temperature of explosion. In addition, there is a large production of primers.

The commercial detonators produced in the Union are of the Briska type, consisting of an aluminium tube about 1½ in. long and 6 mm. wide, which is closed at one end. Into this tube are pressed pre-determined quantities of T.N.T., tetryl, lead azide and lead styphnate, the tubes being filled mechanically. These four ingredients are all manufactured at Modderfontein and Somerset West and among the basic raw materials from which they are produced is nitric acid.

In 1951 the South African mining industry spent £4,755,149 on blasting explosives, all of which were manufactured in the country. There is also a large production of accessories, consisting mainly of commercial detonators, capped fuse, electric detonators, and fuse igniters.

THE MODDERFONTEIN PLANT

An important landmark in the development of the explosives and heavy chemicals industries in South Africa was the erection of a synthetic ammonia plant at Modderfontein, which came into operation in 1932. Among its principal products are nitric acid and ammonium nitrate, the present output of nitric acid from this plant being 26,000 tons annually. Formerly the Union was largely dependent for its nitric acid requirements on imported supplies of Chile saltpetre, which were treated with sulphuric acid. The synthesis plant has enabled demands to be supplied economically from local sources. It also made possible the introduction of ammon gelignites and ammon dynamites, which did much to decrease the cost of explosives to the mining industries.

Ammonia is produced by passing air and steam alternately over heated coke to yield nitrogen, carbon dioxide, hydrogen and carbon monoxide. The impurities present are first removed and the gases are passed with additional steam over an iron catalyst to convert the steam to hydrogen and carbon monoxide to carbon dioxide. The carbon dioxide and any residual carbon monoxide are removed by scrubbing at pressures of 55 atmospheres and 260 atmospheres respectively. At a pressure of 250 atmospheres and a temperature of between 450 and 550 deg. C. the nitrogen and hydrogen combine to form ammonia, which is removed by condensation to liquid form. The pressure is then reduced to between 10 and 20 atmospheres, when the ammonia returns to its gaseous form. Its principal uses are in the manufacture of nitric acid and ammonium nitrate.

Nitric acid is made synthetically by the oxidation of ammonia gas in the presence of a catalyst. The older units at Modderfontein operate at atmospheric pressure and produce 48/50 per cent nitric acid, while the newer installations work under pressure and produce acid of 57/60 per cent strength. This is concentrated where necessary by distillation with sulphuric acid. Chemically pure acid is also produced.

A new factory at Modderfontein costing about £4,000,000 and capable of producing some 30,000 tons of 100 per cent nitric acid annually has almost reached the production stage. Part of its output will be used in the manufacture of explosives, but it is expected that there will be a sufficient balance to enable ammoniated superphosphate to be produced. When the final extensions to the new plant start production next year, enough ammonia will become available to provide ammonium nitrate for agricultural purposes.

Glycerine for the production of nitro-glycerine is ob-

tained as by-product of soap manufacture, but this source can supply only a portion of the country's needs. By 1939 the ammonium nitrate produced at Modderfontein had replaced a large proportion of the nitro-glycerine content of blasting explosives. Ammonium nitrate is produced at Modderfontein by neutralizing nitric acid with ammonia, under pressure, and subsequent crystallization. Besides considerably reducing the Union's dependence on imported glycerine, this undertaking has brought down the cost of blasting explosives.

SULPHURIC ACID PRODUCTION

The Union's production of sulphuric acid rose from 84,198 tons in 1936 to 108,023 tons in 1940 and 127,500 tons in 1945. The plant capacity at the end of the second world war was 145,700 tons per annum. Approximately 37 per cent of the output was then being made by the chamber process from pyrites obtained from the gold mines and the balance by the contact process from imported sulphur. In 1950 90,000 tons of elemented sulphur were imported, but dependence on imported materials has since been substantially reduced by the conversion of the sulphur-burning plant at Umbogintweni to pyrites. Various grades of commercial oleum are produced, as well as chemically pure sulphuric acid. About 85 per cent of the South African output is used in the production of superphosphate fertilizer, 3 per cent in the manufacture of explosives, and the remainder in the production of hydrochloric acids, sulphates and other chemicals. A further substantial increase in the production of sulphuric acid will result from the development of the uranium industry. About 1,000 tons of acid per day will be used in the extraction process and will be produced by treating pyrites from gold bearing ores.

Hydrochloric acid is produced in several plants, and at Modderfontein, Somerset West and Umbogintweni it is made from the action of sulphuric acid on common salt. It is also produced at Geduld, where S.A. Pulp and Paper Industries Ltd. obtain it synthetically from the burning of hydrogen in chlorine gas, both these constituents being derived from the electrolysis of common salt. Over 90 per cent of the total production of hydrochloric acid is consumed by the mining and metallurgical industries.

CHLORINE, LEAD NITRATE AND CYANIDE

Before the war the Union was entirely dependent on importation for supplies of chlorine, which is also required for the treatment of potable water supplies. In 1939, S.A. Pulp and Paper Industries was already producing chlorine for its own needs, but none of the gas so produced was dried and compressed to liquid form for distribution. This need was met by the erection of a plant which came into production in 1943.

The production of lead nitrate was started during the 1914-18 war and has since kept pace with the growing re-

quirements of the gold mines. This chemical is made at Modderfontein by dissolving lead in weak nitric acid, the solution being concentrated and then crystallized. Almost the entire output is consumed by the gold mining industry, in which it has two important applications. It is used to deposit a film of lead on zinc shavings or dust for removing the gold from the cyanide solution. This coating forms a so-called lead-zinc couple, which greatly improves the activity of the zinc. In the treatment of ores containing sulphides and other objectionable materials, a solution of lead nitrate is dripped into the cyanide solution to remove these impurities before the cyanide goes to the zinc boxes.

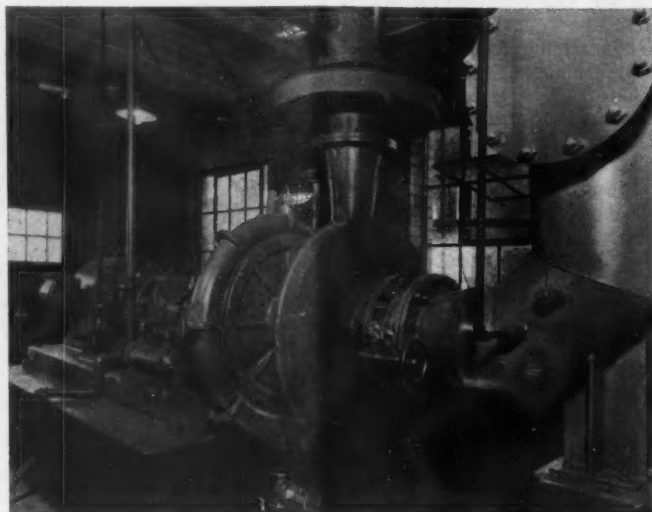
The manufacture of cyanide in South Africa was started in 1938, when a plant erected by South African Cyanamid (Pty.) Ltd., a subsidiary of the North American Cyanide

Ltd. of Canada, came into operation. It had always been the policy of the South African gold mines to assure several sources of supply, and the plant was not, therefore, designed to produce the entire requirements of the industry, but during the war it proved capable of providing more than its normal share by operating at an increased rate. With the co-operation of its parent company in Canada it was able fully to meet the portion of the mining industry's requirements which remained unfulfilled after British producers had supplied as much material as they were able to allocate to

the Witwatersrand under the changing conditions of the war. When war broke out there was also in existence a pilot plant at Modderfontein which manufactured sodium cyanide solution. This solution was distributed to certain mines by tanker lorries and materially assisted in the maintenance of supplies. In 1949 a factory was opened at Klipspruit, Transvaal, by African Explosives and Industries Ltd. for the production of cyanide from locally available raw materials. It was designed for an initial production of some 3,000 tons annually and an ultimate capacity of 3,360 tons. The total consumption of cyanide by the South African mining industry in 1951 amounted to 22,044,174 lb. (100 per cent NaCN), of which 16,349,947 lb. were locally produced.

THE RAND'S CARBIDE SUPPLY

The mining industry's requirements of calcium carbide are supplied by Rand Carbide Ltd. at Witbank and S.A. Carbide Ltd., whose factory is situated approximately halfway between Johannesburg and Durban. Calcium carbide is produced in an electric arc furnace by the fusion of coke and lime at high temperatures, estimated at 3,500 deg. C. In order to produce a product of standard quality on a commercial scale, it is essential to have available an ample supply of electric power at a reasonable cost. The carbide factories are therefore situated in close proximity to sources of electrical supply. The coke used has a sufficiently high carbon content and a low enough percentage of sulphur and phosphorus to give good operating costs without undue power waste. Pitch or tar is used for the manufacture of



The main blower in a sulphuric acid plant on a Witwatersrand gold mine

the continuous electrodes. The product is graded to suit the requirements of customers. Its main use is for illuminating purposes, especially in miners' lamps. In 1951, purchases of carbide by the mining industry totalled 7,505,899 lb.

Soda ash is used in South Africa for the neutralization of acid. It is produced by S.A. Alkali Ltd. from a deposit of sodium carbonate which occurs in the Pretoria saltpan, 26 miles N.N.W. of Pretoria. Boreholes to depths of about 30 ft. have been sunk at intervals over the floor of the pan. From these a solution containing approximately 9 per cent of sodium chloride, 4 per cent of sodium carbonate, and subordinate amounts of sodium bicarbonate is pumped to a reservoir, whence it gravitates to the treatment plant. From there it goes to a triple-effect evaporator. The saturated brine from the evaporator is cooled to atmospheric temperature in a cooling tower, precooled to 60 deg. F., and then cooled to 20 deg. F. Refrigeration is carried out in concrete tanks by ammonia. During the process, washing soda crystallizes out and sodium chloride stays in solution. The separated mixture of crystals and adhering salt is pumped to hydro-extractors and there separated. The crystals of washing soda containing 33 per cent anhydrous sodium carbonate and 2 per cent sodium chloride are bleached by chlorine and boiled down to crystallization. The monohydrate so formed is separated from the mother liquid in a hydro-extractor and subsequently dried in a calciner, leaving soda ash containing 97 per cent of anhydrous sodium carbonate. Production is between 500 and 600 tons quarterly.

A recent product of the S.A. Torbanite Mining and Refining Co. Ltd. is cresylic acid, which is being extensively used for flotation purposes in gold, platinum and copper mining.

OTHER HEAVY CHEMICALS

Among many other heavy chemicals produced in the country may be mentioned aluminium sulphate, phosphoric acid, calcium sulphate, copper sulphate, ferrous sulphate, magnesium sulphate, zinc sulphate, precipitated chalk, copper cyanide, hydrocyanic acid, zinc chloride, and zinc cyanide. In 1940, South Africa imported more than £1,000,000 of oils, waxes, resins, paint and varnish. The manufacture of a large number of chemicals of importance to the mining industry has since been established. Among them is litharge, which is used extensively for assay purposes. The South African product is of high purity. Timber preservatives are made from locally produced zinc chloride, zinc sulphate, silico-fluoride and copper sulphate. There is an extensive paint industry which uses a large number of locally made chemicals.

South Africa's range of chemical products will be very greatly extended when the South African Coal, Oil and Gas Corporation Ltd. (S.A.S.O.L.) starts production during the latter half of this year. The plant will have an estimated production of 76,000,000 gallons of liquid fuels, equivalent to one-eighth of the country's consumption. Its by-products will serve as the raw materials for many new undertakings.

The Design and Use of Belt Conveyors in Mines

by A. Grierson, B.Sc., A.M.I.Min.E.

Readers may like to know that Mr. Grierson's articles recently published in The Mining Journal have now been republished as a monograph and may be obtained from The Mining Journal, price 2s. 6d.

REVIEWS

Statistical Summary of the Mineral Industry—Prepared by the statistical section of the Mineral Resources Division of Colonial Geological Surveys and published by H.M. Stationery Office. Pp. 356. Price 27s. 6d. net or 28s. by post.

The data presented in these pages includes production, exports and imports from 1946 to 1952, the whole being an annual volume of statistical tables compiled from official sources. All countries of the world are included in so far as information is available. Minerals are dealt with alphabetically and countries are arranged under the headings British and Foreign, and in the majority of the production tables, totals are given for British, Foreign and World returns.

Considering the contained matter in more detail, those production tables dealing with copper, lead, tin and zinc show not only the output of ore in terms of metal but give in addition figures of smelter production, while the section on coal deals also with coke, briquettes and main by-products. The petroleum section includes crude petroleum, natural gasoline, natural gas, oil shale, asphalt and refining products. This work is a complete book of reference and its value to industrialists and mining engineers among the many connected with the metals industry is always appreciated. The value of this publication would, however, be much enhanced if it could be published nearer the end of the period to which it relates.

Coal Economy at Collieries Symposium, 1952-53, published by The Institution of Mining Engineers. Pp. 209 with illustrations. Price 20s., to members 10s.

In face of the need for collieries of the United Kingdom to increase production, the Institution of Mining Engineers has organized a symposium with the object of directing attention from long-term planning to the immediate problem of making efficient use of that coal already brought to surface.

This well produced book presents the nine papers read at the symposium, which included many facets of coal mining endeavour, such as economy in steam generation, staff control for plant efficiency, the froth flotation of fines and the policy of coal preparation. The papers are summarized and the conclusions drawn therefrom are presented in the latter pages of the book.

A valuable collection that is well timed in light of current trends.

Petrography.—An introduction to the study of rocks in thin sections, by Howel Williams, Francis J. Turner and Charles M. Gilbert. Published by W. H. Freeman and Co. Inc., United States of America. Pp. 416 with illustrations and indices. Price 56s.

Although the book under review is concerned more with the description of rocks than with problems of genesis, considerable space is nevertheless devoted to the mode of origin of igneous and metamorphic rocks and to the formation of the sedimentaries. No new rock names have been coined and, indeed, the existing list of names has been reduced as much as possible.

The first portion of the book, dealing with igneous rocks, was written by H. Williams; the second on metamorphic rocks by F. J. Turner, and the third on sedimentary rocks by C. M. Gilbert. The microdrawings were made by Mr. Williams. The aim of the authors throughout has been to lay stress on the gradational nature of all rock series and on the arbitrary character of all groupings.

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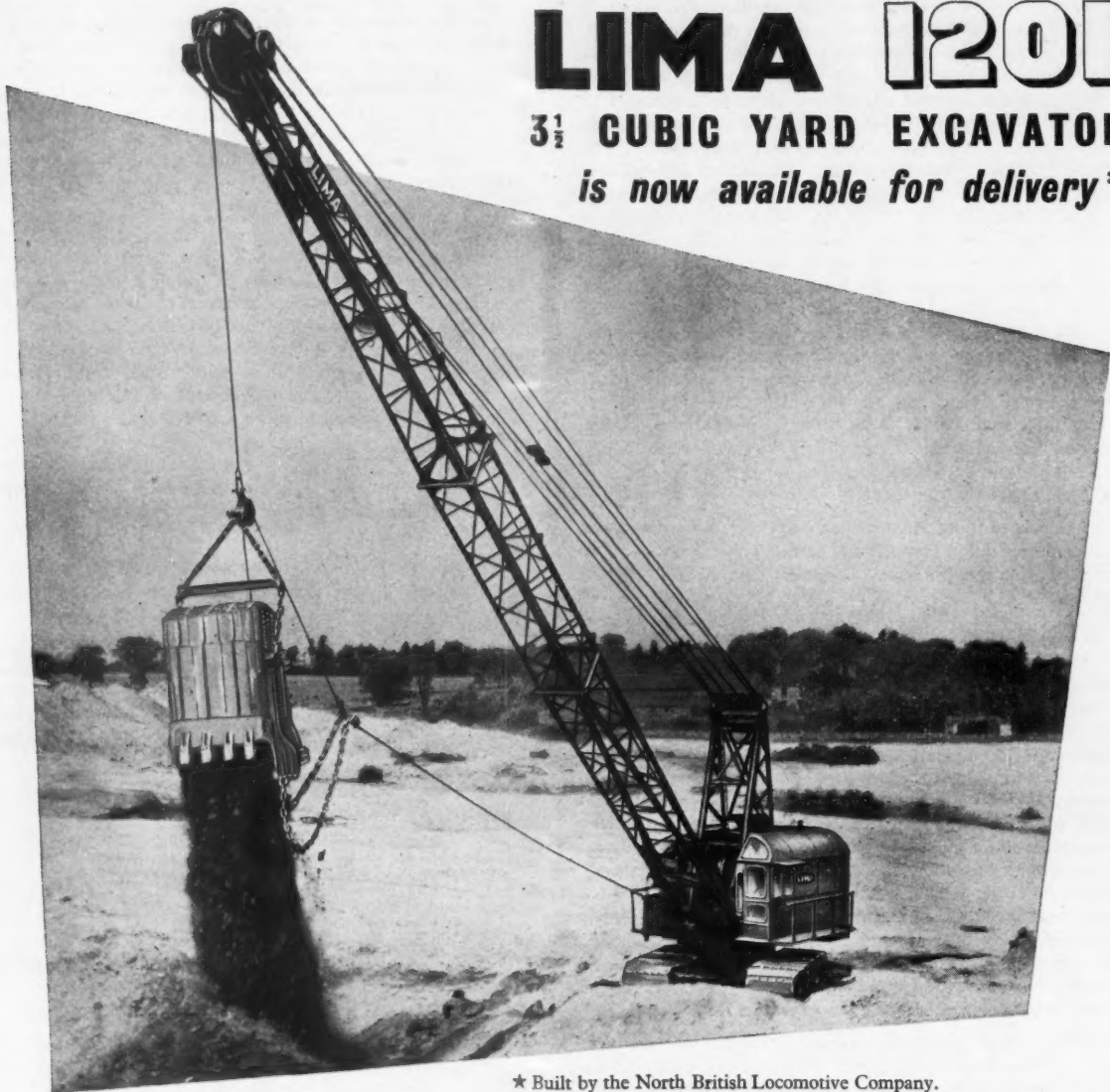
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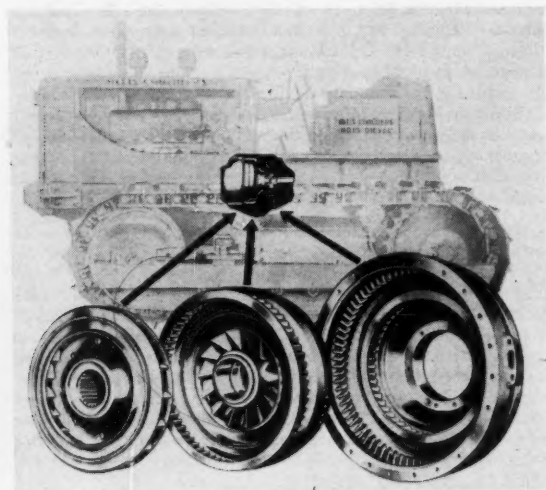
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MACHINERY AND EQUIPMENT

Torque Converter for Tractors

An hydraulic torque converter drive, formerly the unique distinction of the Allis-Chalmers H.D.20 tractor, is now available as an alternative to the conventional transmission in the H.D.15 unit, according to an announcement by Mackay Industrial Equipment Ltd. The torque converter performs the same function as gears in an ordinary transmission, but does the work hydraulically and automatically.

The torque converter is comprised of three units, an impeller wheel, a turbine wheel and a stationary housing. The impeller wheel is similar to a centrifugal pump and is driven by the engine through the engine clutch. It is mounted inside the turbine wheel and the fluid is thrown outwards by centrifugal force to strike the first of the three sets of blades on the turbine wheel. The fluid is then deflected to the first set of reaction blades on the stationary housing, which redirect it to the second set of turbine blades. A second set of reaction blades and a third set of turbine blades utilize the unspent force of the fluid. The torque converter is not merely a fluid coupling, but actually multiplies torque.



A diagrammatic view of the torque converter. Left, impeller wheel; centre, turbine wheel; and right, stationary housing. The three components form a compact unit

Since the combination of drawbar pull and speed is automatically selected by the torque converter, at very low speeds a commensurately high torque is produced. Once the load is moved less drawbar pull is necessary and the torque converter automatically increases the speed of the tractor. All this is achieved within any one gear without slipping the clutch, and even under extreme loads the engine cannot be stalled or overloaded.

The torque converter forms a fluid cushion, which absorbs all shock. Hydraulic steering, which gives finger tip control, and the low operating pressure (25 lb.) of the master clutch reduces operator fatigue. Electric starting is standard on all Allis-Chalmers tractors. An integral part of the torque converter fitted to Allis-Chalmers tractors is an overrunning clutch which engages as soon as the turbine wheel turns faster than the impeller—thus giving a solid drive from the transmission to the engine. A three-speed gear box is incorporated in the H.D.15, this being sufficient to derive maximum efficiency from the torque converter. It is ideally suited to push-loading scrapers, winching, pipe laying and many other tasks of like nature.

A New Utility Tool

A type of hand drill claimed to be adaptable enough to accomplish many of the smaller tasks which normally take up a considerable amount of time in factory or mine is the Do-All,

manufactured by the Climax Rock Drill and Engineering Works Ltd. The unit may be used as a hammer drill or the conventional rotary drill, and is able to fill the need for a universal-type tool by the fitting of a wide range of tools.

The machine embodies a threaded drill spindle, onto which can be screwed either a conventional drill chuck or a drive from the specially designed hammer member, seconds only being necessary to complete the change over. Used as a hammer drill, the manufacturers state that the Do-All will cut brickwork, concrete or masonry, while employed as a portable electric drill with the conventional chuck and twist-drill, the unit will drill holes of up to $\frac{3}{8}$ in. diameter in steel or $\frac{1}{2}$ in. diameter in wood.

The technical details show that the universal-type electric motor operates on a.c. or d.c. current up to 60 cycles at voltages of 50, 100-120, 210-250 and 260-290. Wattage input at full load is 400, rating 30 min., and as a hammer drill 2,000 blows are struck per minute. The drill with chuck is 15 in. long, and with hammer attachment, including retainer, 21 $\frac{1}{2}$ in. long. It weighs 11 $\frac{1}{2}$ lb. or 17 lb. with hammer attachment.

Alternate-Velocity Loading in Quarry Blasting

A recently developed technique of loading holes with quarry explosive, called alternate-velocity loading, may offer quarry operators improved blasting efficiency with better control at considerable savings, according to a report in *Pit and Quarry*. The method consists of loading alternate holes with low-velocity and high-velocity charges. Used in conjunction with the millisecond delay system, it appears to enhance the twisting and shattering action of the fast delays. A cored ammonium nitrate explosive, covered by U.S. Patent No. 2,609,750, is used in the new technique.

In alternate-velocity loading, the faster millisecond delay caps fire the low-velocity holes to utilize the stressing action on the rock; the next delay releases the sharp second blow of the higher-velocity explosive. It is apparent that the slower explosive fired first tends to place tension or stress on the rock without excessive shattering or release of explosive gases. This increased stress or wedging action then seems to give the sharper second explosion a chance to penetrate farther into the burden with a resulting breaking and twisting action considerably greater than that produced by the unmodified millisecond delay system.

After an alternate-velocity blast, holes fired with the low-velocity explosive appear larger and lighter coloured. They show a broader spread of breakage across the face, as contrasted with the thinner marks left by the high-velocity material. It has been found that the use of too high a velocity, at least in rock which is not brittle, appears to work too much on the face rather than on the burden.

High-velocity effects can be achieved economically by using a cored ammonium nitrate explosive. Continuous cores, 1 $\frac{1}{4}$ in. in diameter, extend throughout the cartridge, so that the velocity rate of the cartridge can be governed by the composition of the core. In this fashion a small amount of gelatine gives the entire cartridge the linear velocity behaviour of the core. The result is less costly than varying the explosive ingredients of the whole cartridge. Typical quarry blasting may call for a 60 per cent gelatine core for a high-velocity explosive, and a 30 per cent core for a low-velocity explosive.

It is reported that the use of the alternate-velocity system of loading holes with explosive, combined with the millisecond delay method of blasting, results in considerable savings by producing increases in breakage and better general performance. The cored ammonium nitrate explosive is a low-cost method of achieving high-velocity effects.

A Three-in-One Wire Stripper and Cutter

Mechanical and market research operations have resulted in the production of a three-in-one wire stripper and cutter by Multicore Solders Ltd. The tool will strip insulation from most thicknesses of wire, cleanly cut wires and will also split extruded flex. Adjustment for various thicknesses of wire and cable is carried out by the turn of a screw set in an eccentric disc. The stripper is being marketed under the registered name of Bib Wire Stripper and Cutter. The units are nickel-plated.

METALS, MINERALS AND ALLOYS

COPPER.—It was announced in Washington towards the end of last week that the U.S. Government had agreed on the general provisions for the purchase of 100,000 tons of Chilean copper for the U.S. stockpile. It is understood that these purchases will be credited against the current stockpile programme and have no connection with the new long-term programme referred to elsewhere under "Notes and Comments." Details of the contract are now being worked out.

This purchase represents about half the accumulated Chilean surplus stocks, so that there are still some 100,000 tons plus current production to be marketed. In this connection our Metal Exchange correspondent reports this week that negotiations are progressing with other countries for the disposal of a sizable tonnage on a barter basis. It is also being rumoured that the first consignment of Chilean copper (stated to amount to 1,000 tons) to be imported privately into the U.K. since the War is expected to reach this country towards the end of the month. The Chilean Central Bank stated recently that some 28,000 tons of Chilean copper had been sold in small lots this year up to March 7.

Meanwhile the Chilean Legislature is now considering the bill to establish a policy on copper sales. One of the provisions of the Bill under consideration is reported to be that the subsidiaries of Kennecott and Anaconda in Chile should be allowed to cut back their operations at the same rate as these groups cut back their domestic production.

The current difficulties of the labour situation in the Copper-belt were re-emphasized this week by the strike of 10,000 Africans at the Roan Antelope mine. The strike began last Saturday, apparently in an attempt to secure the dismissal of a white employee. No official statement has been forthcoming from the African Mine Workers' Union, but it is stated by the company that all the miners had returned to work by yesterday. It is unfortunate that this strike should have come at the end of a week of negotiations between the European and native mine workers' unions over which Sir William Lawther had been presiding.

LEAD AND ZINC.—The announcement of the new long-term stockpiling programme in the U.S. discussed elsewhere in "Notes and Comments," coupled with the sustained optimism in London and a belief that U.S. consumers are seeking to replenish their stocks, resulted in a general appreciation in price. The U.S. quotation was raised by $\frac{1}{4}$ c. last Friday and a similar amount on Monday to $13\frac{1}{4}$ c. per lb. Similarly the zinc price rose on the week from $9\frac{1}{4}$ c. to $10\frac{1}{4}$ c.

Prefacing his introduction of a Bill to restrict imports of lead and zinc, Senator Dworshak stated that the new metal stockpiling programme must be regarded as only an interim step in a long-range programme for stabilizing the mining industry. His Bill would place imports of lead in the U.S. yearly at 335,000 s.tons as against 556,000 tons last year and zinc imports to 325,000 s.tons compared with 753,000. His Bill, Senator Dworshak contends, would place imports back into their historic pattern—a somewhat illuminating picture of the protectionist mind, which apparently refuses to admit the possibility that the "historic pattern" of U.S. domestic supply and demand may itself change with the years.

TIN.—Whatever benefits President Eisenhower's new stockpiling plans may have for other metals, it appears unlikely that these will be extended to tin. This, at least, is the conclusion to be drawn from the R.F.C.'s recent recommendation to the Senate Banking Committee that the U.S. Government should cease to operate the Texas smelter at the end of June, by which time, aside from outstanding deliveries under one contract (presumably that with Indonesia), all concentrates now on hand, or receivable, will have been smelted.

In his statement Mr. Kenton Cravens, chief of the R.F.C., is reported to have said that the need for Government participation no longer existed, as, with the completion of the U.S. tin stockpile programme, world production greatly exceeded consumption. Mr. Cravens estimates that the States has between 6 and 10 years' supply of tin on hand which would give them ample time to erect another and better smelter should an emergency arise. Meanwhile, he feels that the smelter merely constitutes a substantial drain on the Treasury.

It is understood that Mr. Cravens favours selling the smelter

to private industry, which raises the interesting question of whether there are any buyers. It can be stated with some confidence that no buyers are likely to be found on the basis of valuing the smelter at anywhere near cost. On the other hand, if the smelter is to be sold for what it will fetch, it may be that it could be economically operated if the overheads were substantially reduced through a drastic writing down of capital values. In such a situation it might well be that the Billiton Company would emerge as a prospective purchaser. Billiton are already the managers of the smelter, and we have always understood that under their contract they would have a first option on the smelter if it ever came on the market.

One interesting speculation is whether any strings would be attached to the sale, either as regards minimum tonnages to be handled by the new owners, or as regards the source from which they draw their ores. This latter question is one which is keenly exercising the Bolivian Government at the present time in the face of the R.F.C.'s lack of interest in renewing their contract for Bolivian ores, of which between 15,000 and 20,000 tons are stated to be on offer to the United States this year. The Bolivian Mining Corporation is reported to have made approaches to various European smelters for the disposal of this tonnage. Meanwhile, most of the medium sized Bolivian tin mines are reported to have already ceased operations.

Inevitably the U.S. Government must regard the disposal of Bolivian tin as a political, quite as much as an economic, problem, and there may be some significance in a recent statement by the Bolivian Foreign Minister in La Paz that his government was still seeking loans from the Export-Import Bank, one of the purposes of which would be to develop hydro-electric power in the east of Bolivia. This suggests that the idea of establishing a local smelter is still by no means dead.

CHROMIUM.—Though the domestic production of chromite ores in the U.S. increased last year to two and a half times the 1952 figure, the total of 57,466 s.tons was inappreciable compared with imports which amounted to 2,224,321 s.tons. This latter figure was 31 per cent in excess of the 1952 record according to the U.S. Bureau of the Census. Turkey was the largest supplier of metallurgical ore, the Philippines of refractory chromite, while South Africa supplied all the chemical grade. In terms of chromic oxide the imported ores contained a total of 840,383 tons Cr_2O_3 . Consumption of chromite ores last year was 1,338,831 s.tons compared with 1,185,460 in 1952 and the total new supply was 2,281,787 s.tons compared with 1,721,401 in 1952.

The Electro Metallurgical Co., a division of Union Carbide, has started to produce electrolytic chromium on a commercial scale. The plant will have an output of some 2,000 tons per year when all the electrolytic units are in operation.

Turkish chromite output last year is estimated at 180,000 tons. However, exports at the present time have practically ceased, owing apparently to the government refusing permission to export except at official prices, which are considerably above the world market. Foreign bids received at \$38.5 per ton f.o.b. are said to have been rejected. The U.S.A., until recently Turkey's principal outlet for her chrome, is now stated to be covering her requirements in other markets.

QUICKSILVER.—The large barter deals between the U.S. and Spain in February, in which quicksilver has figured extensively, has resulted in these producers having largely disposed of their supplies, and with the dock strikes in America an extremely tight position has developed, resulting in only small lots being available for which \$205-\$210 at least have been paid. In London the price rose this week by £3 to £72-£73 per flask.

TUNGSTEN.—The firmer appearance of the tungsten market reported last week has resulted in the Ministry of Materials increasing its selling prices for wolframite and scheelite three times in the past week. They now stand at 155s. and 150s. per 1-ton unit respectively. The U.S. price however has not been increased since last week, and remains at \$16/18 per s.ton unit plus duty.

Although private trading in the U.K. was resumed officially yesterday, consumers have still to buy 75 per cent of their requirements from Government sources. Moreover, some time is

likely to elapse before private shipments will be available for prompt delivery in London in any quantity.

URANIUM.—The South African Atomic Energy Board is to make a survey of an area in the north-west of Cape Province and in South-West Africa where reports of deposits of radioactive materials have been received.

GOLD.—The U.S. Senate Banking Committee was expected to hold meetings this week to consider legislation effecting the sale of gold and a possible return to the gold standard. Four Bills have been introduced.

The London market has settled down to its task admirably. The volume of business transacted has been heavier than many expected and enquiries have reached the market from various Continental sources. Earlier this week the price was 248s. 5½d. per f.o.z. but on Wednesday there was less activity and the price was fixed yesterday at 248s. 3½d.

Iron and Steel

Although no expansion in the volume of steel exports has been achieved since the reduction in export prices, shipments are maintained at approximately last year's levels. Increased trade with Commonwealth countries has offset a shrinkage in other directions. Both in home and foreign trade, however, profit margins are very much smaller. On home sales profits are down because of the rise in production costs and Sir Ellis Hunter, former president of the British Iron and Steel Federation, now speaks of "the urgent need for a review of prices to provide for depreciation and other charges."

In all other respects the industry displays convincing signs of health and vigour. Production is maintained at a high level and generally outputs are fully taken up as they become available for distribution. The steel works, moreover, are receiving ample supplies of coal and coke, iron ore and scrap with imports of foreign ore running at the rate of over 10,000,000 tons a year.

A minority of light foundries are not working at full capacity but blast furnaces producing high phosphoric iron are no longer under the necessity of taking surplus iron into stock. Better supplies of haematite are available but the available tonnages of low and medium phosphoric irons fall short of requirements.

Most of the re-rollers are working short time. They are unable to compete with the low prices quoted by Continental makers of light sections and bars, and are reliant almost entirely on a restricted volume of orders from home sources. Ample supplies of billets are available but steel makers are producing larger tonnages of short bars and slabs to cater for the needs of the sheet trade. The boom in sheets, especially the lighter gauges, is quite remarkable. Overseas orders for shipment before June 30 have had to be refused because the export quotas have been exhausted, and a fair amount of business has already been booked for the second half of the year.

The London Metal Market

(From Our Metal Exchange Correspondent)

The highlights this week have been the lead and zinc markets, which have both advanced rapidly on the news that the U.S. Government was considering starting a new stockpiling programme and that these two metals would almost certainly be included, and as the New York price has risen in sympathy a sharp fall back to previous levels is not expected. Further examination of the stockpile proposals, however, does not bear out the original "bullish" interpretation put on the news, as it is apparent that as far as items which are produced in the U.S. are concerned the programme will be based on maintaining home output by such means as long-term contracts at guaranteed prices, and the material arising from purchases made under these guarantees will be stockpiled. In addition, foreign purchases will only be made at such times when prices will not be unduly affected, i.e. in times of falling markets. A natural consequence of long-term contracts must be attempts to keep up the price level, and it was not surprising to hear that a Bill had been introduced into the Senate seeking to limit the imports of lead and zinc to approximately half the 1953 figures.

It can be assumed that these metals will not feature among the selected range of goods on which the President is hoping to reduce tariffs; in fact it seems more than ever probable that the import duties on lead and zinc will be raised, which, under

present circumstances, would lead to an eventual reduction in the sterling prices. It is also reported that the Mexican Government is now considering purchasing locally-produced lead and zinc at a price either at, or above, that existing to-day, but it is not yet clear whether the intention is to stockpile the material or to sell it at current prices with the Government taking any loss.

The main item of news in the copper market was that the Chileans have sold 100,000 tons of copper to the American Government, and as it appears that negotiations are in an advanced stage with a number of other countries on a barter basis for a sizeable tonnage, a break in the price is not expected for some months.

The tin market has been uninteresting with a slight decrease in the backwardation owing to the delivery to the market of tin arriving from Malaya. On Thursday morning the Eastern price was equivalent to £716 5s. per ton c.i.f. Europe.

Closing prices and turnovers are given in the following table:

	March 25		April 2	
	Buyers	Sellers	Buyers	Sellers
Tin				
Cash	£725	£730	£732½	£737½
Three months	£690	£692½	£705	£706
Settlement		£730		£737½
Week's turnover		610 tons		280 tons
Lead				
Current month	£87½	£88	£93½	£94
Three months	£86½	£86½	£91½	£91½
Week's turnover		2,550 tons		6,000 tons
Zinc				
Current month	£75½	£75½	£79½	£80½
Three months	£74½	£74½	£78½	£78½
Week's turnover		4,350 tons		4,600 tons
Copper				
Cash	£238	£239	£233	£234
Three months	£229	£229½	£227	£227½
Settlement		£239		£234
Week's turnover		6,125 tons		5,800 tons

OTHER LONDON PRICES — APRIL 1

ANTIMONY

English (99%) delivered, 10 cwt. and over	£210 per ton
Crude (70%)	£200 per ton
Ore (60% basis)	22s./24s. nom. per unit, c.i.f.

NICKEL

99.5% (home trade)	£483 per ton
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OTHER METALS

Aluminium, 99.5%, £156 per ton	Osmium, £50 oz. nom.
Bismuth	Palladium, £7 10s. oz.
(min. 4 cwt. lots) 16s. lb.	Platinum, £30/£31
Cadmium (Empire), 13s. lb.	Rhodium, £43 10s. oz.
Chromium, 6s. 5d./7s. 6d. lb.	Ruthenium, £23 oz.
Cobalt, 20s. lb.	Quicksilver, £72/£73
Gold, 248s. 3½d. f.o.z.	ex-warehouse
Iridium, £55 oz. nom.	Selenium, 35s. 9d. nom.
Magnesium, 2s. 10½d. lb.	per lb.
Manganese Metal (96%-98%)	Silver 73½d. f.o.z. spot and
£225/£262	73½d. f.d.
Osmiridium, £40 oz. nom.	Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC.

Bismuth	30% 5s. lb. c.i.f.
	20% 3s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (lumpy)	£14 5s. 6d. per ton c.i.f.
" " (concentrates)	£14 5s. 6d. per ton c.i.f.
" " Refractory	£13 17s. 6d. per ton c.i.f.
Baluchistan Metallurgical	£15 19s. 6d. per ton c.i.f.
Magnesite, ground calcined	£26-£27 d/d
Magnesite, Raw	£10 - £11 d/d
Molybdenite (85% basis)	102s. 4d.-103s. per unit c.i.f.
Wolfram (65%)*	World buying 135s./155s.
	nom. 155s. U.K. Selling
Scheelite (65%)*	World buying price nom.
	150s. U.K. Selling
Tungsten Metal Powder ..	12s. 3d. nom. per lb. (home)
(98% Min. W.)	
Ferro-tungsten	9s. 3d. nom. per lb. (home)
Carbide, 4-cwt. lots	£35 13s. 9d. d/d per ton
Ferro-manganese, home ..	£53 10s. 0d. per ton
Manganese Ore Indian c.i.f. Europe	
(46%-48%)	7s. 4d. - 7s. 9d. per unit
Brass Wire	2s. 4½d. per lb. basis
Brass Tubes, solid drawn	1s. 8½d. per lb. basis

* These prices take effect from April 2.

COMPANY NEWS AND VIEWS

Anglo American Corporation Maintains Dividend

With the payment of a final dividend of 4s. per share, and the interim payment already declared of 2s. per share, Anglo American Corporation of South Africa are paying a total of 6s. per share for the year ended December 31, 1953, the same as was paid in 1952.

Subject to final audit, the profit for the year, after providing for taxation, expanded by £300,000 to £3,315,000 which presumably reflects—in part at any rate—increased dividends received from the Corporation's large shareholdings in the Copperbelt's producers. The sum of £1,000,000 was allocated to general reserve which now stands at £18,900,000. This account was increased by £4,400,000 in the preceding year when the net premium received from a share issue last May provided £3,636,303, and raised the issued share capital to £3,431,727. Sir Ernest Oppenheimer is chairman.

Brakpan and Springs Annual Reports

Two Rand producing mines in the Anglo American Corporation of South Africa group have now published their reports and accounts for the year ended December 31, 1953. A preview of what shareholders could expect when the full accounts were published was provided by the analysis of the quarterly results of the Rand and O.F.S. producing mines which appeared in our issue of February 5. However, when the analysis table was published in that issue it was stated that certain discrepancies between the cumulative quarterly results and the final figures appearing in the annual reports and accounts would inevitably arise owing to adjustments which were not normally made before the companies year-end accounts were officially published.

In the case of Brakpan, the only major difference occurring between the figures given in our table and that published in the report and accounts refers to net profit which we published at £257,100, but which, in fact, was £332,931, due almost wholly to dividend income of £49,647 received on its holding of 361,067 shares in South African Land and Exploration Company and to a credit of £22,609 arising in respect of dividends forfeited prior to December 31, 1952, which were previously held in suspense.

The profit and loss account of Springs compared with our analysis table showed that while cost per ton milled was unchanged, the cost per oz. produced rose by 11d. to 238s. 6d., which was responsible for reducing the working profit, excluding premium revenue, to £112,104 as against £120,800 published in our table. Tax liabilities were less by about £1,000 and net profit by about £5,000, although these minor changes did not affect earnings per share which were unaltered at 3½d. The consulting engineer of Springs reports that all work on the Kimberley Reef will be completed during the current year. In common with its neighbour, Brakpan, there was an improvement in the electric power supply.

Anglo American's Offer to "Sammies"

It has been announced by South African Mines Selection Ltd. that an offer has been made by the Anglo American Corporation of South Africa to acquire the whole of the company's one class issued ordinary capital for 20s. per share. This offer, of course, excludes that part already held by the corporation itself. On completion of the transaction "Sammies" will subscribe for shares in Anglo American at 12s. to the full amount of the cash received from the deal. Shareholders of "Sammies" will thus receive four Anglo American for every 25 shares presently held.

During the next fortnight full details of the proposal will be circulated to shareholders of South African Mines Selection.

Spaarwater Reports Loss

The report and accounts of Spaarwater Gold Mining for the year ended December 31 last showed that a net loss of £22,436 (£20,166) was incurred on the year's operations thereby raising the cumulative loss carried forward in the profit and loss account to £173,660.

The directors in their report state that tests in connection with the possibility of uranium production have been conducted on the mine but to date the results have not justified an application for the mine to be considered as a uranium producer. Major-General W. W. Richards is chairman. Meeting, Con-

solidated Gold Fields Building, 75 Fox Street, Johannesburg, May 14.

Konongo Pays 5 Per Cent Interim

Konongo, the high grade West African gold producer, in an advance profit statement, has announced the payment of 10 per cent, equivalent to 2.4d. per share in respect of the year ended September 30, 1953, the same as was paid in the preceding year.

Year to Sept. 30	Working Profit £	Depre- ciation £	Taxa- tion £	Net Profit £	Divi- dend £	Carry Forward £
1953	154,406	21,203*	98,000	35,203	34,059	55,513
1952	135,453	17,236	89,500	28,717	34,059	56,657

* Includes £2,832 arising from loss on sale of investments.

From the monthly production returns it was apparent that Konongo experienced a more successful year than in the preceding 12 month period as its gold production rose from 26,325 f.oz. to 28,093 f.oz., which yielded a working profit of £132,600 compared with £118,500. During the first five months of the current year the company has steadily forged ahead and working profits at £65,200 show an increase of some £14,000 over the corresponding period of the year under review. These good results are reflected in the company's announcement of an interim dividend in respect of the current year of 5 per cent. No interim dividend was paid during the year under review. The dividend of 10 per cent will be paid on May 22 to all those registered on April 23. Meeting, London, May 11.

Camp Bird Pays Less

Camp Bird have announced, in a preliminary profit statement giving the results for the calendar year 1953, a dividend of 9d. per 10s. share (equal to 4.95d. per share net with income tax at 9s. in the £) compared with the payment of 1s. per share in 1952.

Working profit for 1953 — subject to audit — amounted to £127,813 (£211,607). After adding £13,835 (nil), E.P.L. provision no longer required, and deducting taxation charges of £40,028 (£112,316) the net profit was slightly higher at £101,620 compared with £99,291. The sum of £50,000 was again transferred to investment reserve, and after appropriating £44,836 (£59,782) for the proposed dividend the forward balance at the financial year-end was £42,703 compared with £35,919 brought in.

The dividend will be paid on May 12 to all those registered on April 12. Meeting subject to confirmation, will be held on May 4. Mr. F. C. Heley is chairman.

B.G. Consolidated Passes Dividend

A preliminary profit statement of British Guiana Consolidated Goldfields for the year 1953 has announced a loss of £13,141 on the year's operations, plus a net loss of £2,029 on the proposed change-over to the hydro-electric power system. Accordingly, no dividend is being recommended against 8 per cent in the preceding year. Meeting, London, May 3.

Vereeniging Brick and Tile Maintain Dividend

The consolidated profit and loss account of Vereeniging Brick and Tile for the year ended December 31, 1953, disclosed that working profits declined to £442,060 compared with £474,563 in 1952. Tax charges were less, £137,622 against £153,135, and after deducting minority shareholders' interest of £5,571 (£14,969), the group net profit for the year was £298,867 compared with £306,459. The total dividend distribution was repeated at 1s. per 5s. share, which together with the preference dividends required £277,500, leaving the carry forward at the financial year-end at £119,759 compared with £98,392 brought in. Mr. T. Coulter is chairman. Meeting, 44 Main Street, Johannesburg, May 28.

New Appointments at Capper Pass

Following the death on March 8 of Sir Paul Gueterbock, who had been managing director of Capper Pass and Son Ltd. since 1937, the Hon. J. F. A. Roche and Mr. E. H. Jones have been appointed joint managing directors to succeed him. Lt.-Col. S. G. C. MacWaters has been appointed to the vacant seat on the board.

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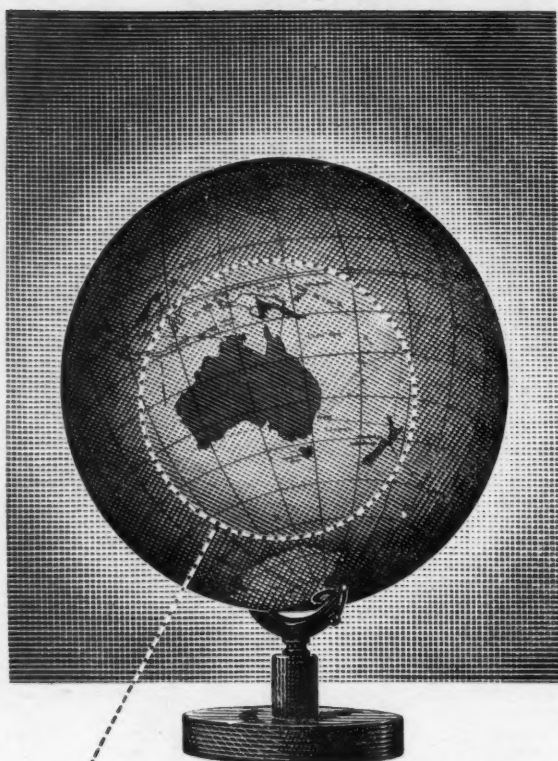
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THE BRITISH SOUTH AFRICA COMPANY

INCREASED PROFIT AND DIVIDEND STRONG FINANCIAL POSITION

The fifty-sixth annual meeting of The British South Africa Company was held on March 25 at The Chartered Insurance Institute, 20 Aldermanbury, London, E.C.2. Sir Dougal O. Malcolm, K.C.M.G. (the president), presiding.

The president, in the course of his speech, said: You will see that our net mining revenue from Northern Rhodesia at £7,787,400 exceeded by rather more than £720,000 the corresponding figure for the year before. As against that our taxation on the profits of the year at £5,972,000, which included Excess Profits Levy for the whole 12 months, exceeded the figure for the year before, which included that levy for only nine months, by nearly £340,000.

The result of the whole thing is that our profit for the year at £2,988,143 is rather more than £300,000 up; and that after paying a total dividend of 50 per cent, if you approve of that as against 40 per cent, we shall carry forward for the year the sum of £1,181,289, as against £1,294,997 for the year before, thus increasing our unappropriated profits reserve to the impressive figure of £5,795,846. Not a bad year, as I hope you will agree.

But I will say a word about our investments standing at a little under £12,000,000 as against a little under £11,250,000 for the previous year. The book value of the quoted investments is down by £1,700,000 as compared with the position at September 30, 1952. This is mainly due to the fact that in the course of the year under review we transferred quoted investments to about that book value to a new investment trust company in Rhodesia in which we have a half interest and the shares of which are not themselves quoted. This, in turn, is the main reason why our unquoted investments in the balance sheet have increased from £2,359,516 at September 30, 1952, to £4,871,733, the greater part of the balance being accounted for by an increase of £474,000 in the amount of the money we have out on loan.

The market value of the quoted investments at September, 1953, was £9,591,866, comparing with a book value of £7,105,463, and thus showing an appreciation of about £2,500,000, or about £1,500,000 less than the comparable appreciation of about £4,000,000 at September, 1952. We are not dismayed by these quite normal market fluctuations. A valuation made up about ten days ago of the quoted investments at present held (which have a book value of £8,679,300) amounts to £12,941,400, showing an appreciation of £4,262,100 on their book value.

The setting up of the new investment trust company in Rhodesia is in accordance with our policy of being conservative in the matter of dividends while building up so far as we can a great body of investments in order to provide for the day, now some 32 years hence, when our Northern Rhodesia mineral rights will fall to be ceded to the Northern Rhodesian Government.

Our investments, including those held by the Rhodesian Investment Trust Company, in Northern Rhodesian mining companies are large, and we also have very large investments in mining and finance companies in the Union of South Africa, which directly and indirectly cover a very substantial stake in the new and promising goldfields in the Orange Free State, as well as in the West Witwatersrand; mainly, of course, gold, but with some possibilities, I won't put it higher than that, in the way of uranium. They also cover considerable interests in diamonds and coal.

Our current assets at £9,878,700 exceed the previous year's figure by over £2,000,000, the balance at bankers and cash in hand exceeding the previous year's figure by a little over £1,000,000, and the excess of current assets over current liabilities at nearly £2,000,000 exceeding the previous year's figure by about £600,000.

As regards the year now current, and particularly as regards our great interest in Northern Rhodesian copper, there is nothing that I dislike more than trying to deal in prophecy. But I can say, I think, that we are not likely to do so well in the matter of the rate of royalty per ton of copper produced. That rate depends on the value of copper as calculated for royalty purposes, and that value is likely to be less than the figure of a fraction under £249 a ton for the year under review. Many conjectures, into which I will not enter, are being made as to the probable course of prices in the near future; but I do not see any reason to apprehend any spectacular fall. The rate of production of copper for the current year seems likely to be about the same as it was during the year under review. And looking further ahead the outlook as regards the future production of copper is good with the approaching disappearance of the difficulties with which the copper-mining companies have

had to contend in the matter of power supply, and with the prospects of new producers, notably Bancroft Mines Ltd., coming into the field. Of course, we are doing all we can to encourage new prospecting.

And while our net mineral revenue for the year now current may not be as good as it was in the year under review, we have to remember that, apart from any shocks which the Chancellor of the Exchequer may give us in his forthcoming Budget, though I hope that there may not be any, we shall suffer the excess profits levy for only three months, as against the whole 12 months for the year under review.

All round, then, I don't think that we need anticipate difficulty in the year now current in maintaining our proposed 50 per cent dividend.

The year 1953 was a memorable one for other than purely business reasons. The Coronation was an event not to be forgotten by anyone of our race, but for us in particular the year was momentous as covering the centenary of the birth of our founder, Cecil Rhodes, in 1853.

The centenary was marked by the holding at Bulawayo of an exhibition which by common consent was an unqualified success. Her Majesty the Queen Mother most graciously paid to Rhodesia the signal honour of a personal visit for the purpose of formally opening the exhibition and we cannot be sufficiently grateful to Her Majesty for that.

I think that I can fairly claim that its success, though countless willing helpers contributed to it, was due more than to any other one man to our resident director, Colonel Sir Ellis Robins, whose strenuous and self-sacrificing work for the exhibition has been suitably recognized by Her Majesty by the conferment on him of the rank of Knight of the Order of the British Empire. All our congratulations are due to him upon that event.

The year 1953 moreover has witnessed the inauguration of the Federation of the Rhodesias and Nyasaland, which has now started on its career having as its first Prime Minister Sir Godfrey Huggins, who for 20 years before had been the wise and trusted Prime Minister of the responsibly governed colony of Southern Rhodesia.

The report and accounts were unanimously adopted, and the dividend of 50 per cent was approved.

At a subsequent extraordinary general meeting, a resolution was unanimously passed authorizing the directors to Petition Her Majesty in Council for the grant of a Supplemental Charter.

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- (b) Constructed by Lobnitz, Renfrew, 1930. Pontoon Dimensions, length 168 ft., breadth 52 ft., depth moulded 11 ft. Digging depth 62 ft. Capacity 120,000 - 150,000 cu. yds. per month. Boiler, B. and W. turbine furnace, wood fired. Treatment plant Hartz jigs: 8 primary, 2 clean-up. Electric Power 225 kVA., 440 V., 400 A., 3 phase for jigs concentrate pumps, screen, saveall and lighting, other units steam driven.

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The annual general meeting of John Summers and Sons, Limited, was held on March 26 at Shotton, Chester, Mr. Richard F. Summers, chairman of the company, presiding.

The following is the report of the directors circulated to stockholders:—

The directors have pleasure in submitting their annual report together with the audited accounts of the company for the 53 weeks ended October 3, 1953.

DEVELOPMENT SCHEME AT SHOTTON WORKS

During the year further large units of plant covered by the first stage of the development scheme at the Shotton Works were completed and brought into production, and construction of the further plant included in the second stage is proceeding.

Expenditure during the year amounted to £3,905,741, giving a total expenditure to date of £17,648,374. Of this total £16,592,011, representing the expenditure on plant now in production, is included under the main heading of Fixed Plant and Machinery, and the balance £1,056,363 is retained under the heading "Development Scheme."

REALIZATION OF COLLIERY ASSETS

During the year final agreement was reached regarding the compensation value of the Colliery Assets which passed from certain of the subsidiary companies to the Coal Board on January 1, 1947. The total surplus over the book value at the date of take over, £559,426, is shown as a separate item in the Consolidated Balance Sheet. Certain other matters in connection with the collieries have still to be finally settled and it is anticipated that this surplus should be increased during the current year by at least a further £100,000.

DEBENTURE STOCK

The first operation of the Sinking Fund covering the redemption of this stock was effected by the surrender on June 15 of £80,000 stock held by the company. This stock was cancelled and is not re-issuable. The company is continuing its policy of purchasing such of the stock as is offered from time to time on the Stock Exchange to meet future annual operations of the Sinking Fund.

PROFIT AND LOSS ACCOUNT

The year has seen the coming into operation of the majority of the new plant at the Shotton Works and it could not be expected that these large units of plant—coke ovens, blast

furnace and steel melting shop—would show satisfactory results during the running-in period while experience was being acquired and there were the inevitable teething troubles. This has resulted in a reduction in the Trading Profit of the parent company compared with that of the previous year. By the end of the year, however, substantial progress had been made and production is now on a more satisfactory basis.

Despite the fact that the new plant did not contribute in any material way to the profits of the year full provision was made for depreciation from the dates the various units came into operation.

During the year export of the company's products was still subject to control but satisfactory prices were obtained for the tonnage actually sold in the export market.

DEPRECIATION AND TAXATION

A further £147,095 has been transferred to the amount set aside for equalization of taxation, the balance at the credit of which is now £2,300,000 in the parent company and £2,383,378 for the whole group. The methods adopted in preparing the accounts of the company as regards provision for depreciation and maintenance of certain items of plant, including relining of furnaces, etc., differ from those employed in computing the profits for taxation purposes, and it is proposed to use this special reserve to equalize the effect of these differences and so ensure that the taxation charged in any year's profit and loss account will bear a more direct relation to the profits of that year than would otherwise be the case.

The half-yearly dividend on the 4½ per cent Cumulative Preference Stock has been paid on the due dates; an interim dividend of 3 per cent was paid on the Ordinary Stock on April 1 and provision has been made for a final dividend of 5½ per cent, making a total dividend for the year of 8½ per cent, the same rate as has been paid for a number of years.

The only other appropriation recommended by the directors is a transfer of £75,000 to Debenture Redemption Reserve, leaving £165,921 at the credit of Profit and Loss Account to be carried forward to next year.

The report and accounts were unanimously adopted and the dividends as recommended were approved.

The retiring directors, Mr. H. C. Irvine, M.B.E., Mr. Melvyn H. Rollason, Mr. J. Ivan Spens, O.B.E., C.A., Mr. Anthony B. Stobart and Mr. G. Spencer Summers, M.P., were re-elected and, the remuneration of the auditors, Messrs. Deloitte, Plender, Griffiths and Co. was fixed for the current year.

THE PROPRIETORS of British Patent No. 683578 are prepared to sell the Patent or to licence British manufacturers to work thereunder. It relates to "Improved Method of Producing Briquettes from Coal." Address: Boulton, Wade and Tennant, 112 Hatton Garden, London, E.C.1.

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March 29, 1954. E. C. SMITH, Principal.

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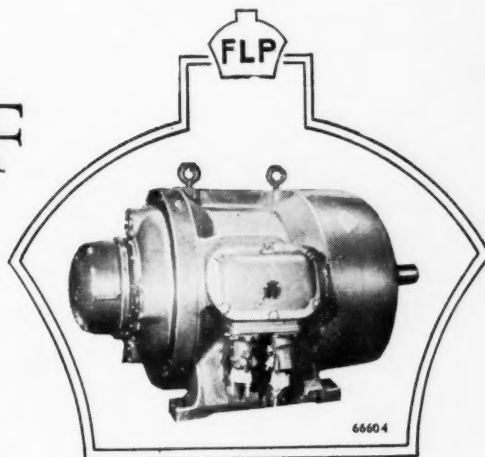
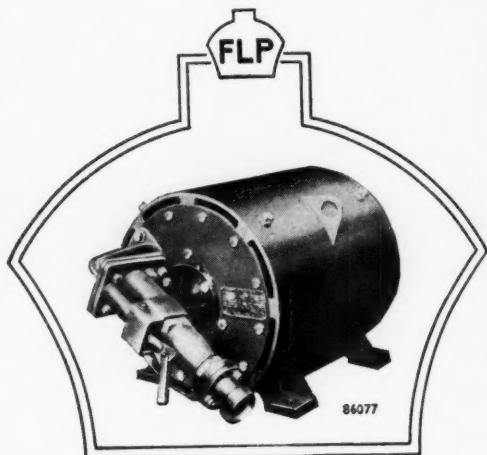
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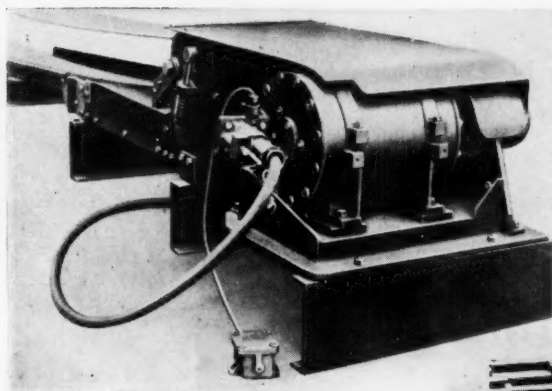
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FLAMEPROOF



Top Left: *Totally-enclosed fan-cooled flameproof squirrel-cage motor, type KF.*
 Top Right: *T.E.F.C. flameproof slipring motor, type FW.*

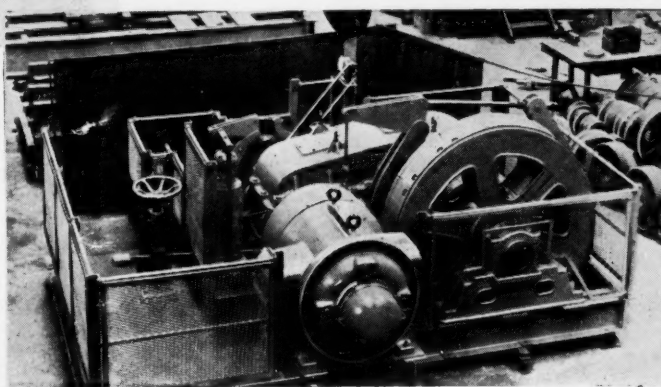
Metrovick Motors for Mines



76058

Above: *Type KF flameproof motor driving a "Huwood" conveyor.*

Right: *125 hp, 580 rpm totally-enclosed, fan-cooled, flameproof Metrovick slipring induction motor driving Beckett and Anderson "Man-Riding" haulage for a colliery. Electro-hydraulic thruster operating main brake is seen on left of motor.*



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